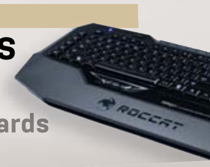


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On the Cover
Photography by
Mark Madeo

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Gordon Mah Ung

CES REDUX

THE BOOTHS HAVE been packed into storage, the hangovers forgotten, and the world's biggest gadget show is but a distant memory now.

With CES 2013 fading into the rearview memory, it's time to reflect on the biggest trends and the coolest products. Hands down, the Dish Hopper was the best of show. Sorry, just kidding, but corporate made me say it. OK, that's a joke, too. No one made me say anything.

I'll run down the quick inventory of what impressed me: At the top of the list is Nvidia's Project Shield. The Shield is truly difficult to wrap your head around, as it defies any of the traditional categories, but I put myself in the camp that "gets it" and what Nvidia is trying to do. Whether Nvidia can pull it off is another question, but I see a lot of potential in the handheld/streaming/controller/bottle opener. The device could finally give Android game developers a good platform to shoot for in making truly compelling games, and it pays the proper homage to the true king of "real" gaming: the PC. We'll see if Nvidia can deliver it, and at a price people will pay.

The second most significant reveal was Intel's demo of its next-gen Haswell chip, running a game alongside an Ivy Bridge part with GeForce GT 650M graphics. On close examination, I could tell the difference between the integrated and discrete GPU, but 95 percent of people would be hard-pressed to. That's a big deal, considering the GeForce GT 650M is a peppy little part. I don't doubt that Nvidia will have moved on from the 650M by the time Haswell launches, but consumers will still be getting a lot of graphics for "free" when Haswell ships this summer-ish.

Number three is the amalgamation of touch-enabled Windows 8 devices. From gigantic tablets to laptops, Windows 8 devices using x86 were out in force at CES. This tells me there is still an appetite for PCs despite all the gloomy headlines, and that touch is actually going somewhere. In fact, the touch laptop I used during CES has convinced me that my next laptop *must* have a touchscreen.

Finally, I was impressed by the presence of various desktop PC OEMs and case makers. They may not have all been on the show floor, but believe me, both groups were in Vegas showing massive, fire-breathing power boxes that many believed were long extinct at "gadget" shows like CES. That's not true by a long shot. I saw PCs so decadent and loaded with lethal hardware, I'm not sure how they got past TSA security checkpoints. I can tell you for sure, enthusiast PC computing is alive and well at CES, but I can't say anymore than that because… what happens in Vegas truly stays in Vegas.



Gordon Mah Ung is Maximum PC's deputy editor, senior hardware expert, and all-around muckraker.

↘ submit your questions to: comments@maximumpc.com

THE NEWS

Project Shield Difficult to Define

Nvidia's ambitious gaming box crosses mobile, console, and PC gaming lines

IS IT A PORTABLE game console, a living room game console, a streaming box, or a Steam box? Those are the questions people are asking about Nvidia's ambitious new gaming box, code-named Project Shield.

Shield looks like a thick Xbox 360 controller, but the machine is much more than just buttons and joysticks. The most obvious difference is the 5-inch touchscreen that Nvidia says has "retinal" resolution, at 1280x720 pixels. It's powered by Nvidia's new Tegra 4 chip, which is a big upgrade over the Tegra 3. The most notable changes include the quad A15 cores versus the quad A9 ARM cores in Tegra 3, 72 GPU cores versus 12 GPU cores, and the addition of a soft LTE modem.





Nvidia says Project Shield won't rely on the same business model as traditional consoles—i.e., the hardware will not be sold at a loss in favor of game license fees.

The Shield's OS is Android 4.2 Jelly Bean and thus lets the device access games in the Google Play market as well as optimized games in Nvidia's TegraZone. The Shield's biggest parlor trick may be its ability to stream PC games. Tucked into the company's 6-series cards is an encoding engine that enables real-time streaming of PC games to the Shield's screen over Wi-Fi, which can then be output to a 4K display via the device's 4K-enabled HDMI port. Shield can support games installed on the PC, and perhaps even cooler, will function as a Steam Big Picture box.

With all these features, it's hard to pigeonhole exactly what Shield is or is meant to do. In fact, the company denies Shield is even a game console. In an interview with VentureBeat, the company's CEO, Jen-Hsun Huang, described Shield as just another Android digital device that will be in your collection, but one that happens to be better for enjoying games.

Shield will also differ by eschewing the printer/ink business model common among console makers. Nvidia says it doesn't intend to sell the hardware at a loss that's recouped by charging game developers license fees. Shield, like Android, will be an open platform. As Huang told VentureBeat, Shield is aimed at core Nvidia customers: Android and GeForce gamers who believe in open platforms.

It helps that Nvidia won't be in any of the upcoming game consoles, too, so there's no partners to anger. Shield is also free to exploit the newer game models, such as free-to-play, and will likely leverage Nvidia's GRID, which promises to stream high-quality games to any device over the Internet.

The price on Shield has not been announced, but Huang has said it will be in line with what you expect for an Android device and the value it delivers.

The reaction from the press has been polarized. Some have questioned whether Project Shield makes sense in light of Nintendo and Sony's sinking portable-gaming numbers; and what high-end Android games are there to even play? Others say the move is smart on Nvidia's part and could very well be the catalyst Android gaming needs to overtake iOS devices. **–Gordon Mah Ung**

Canonical Announces Ubuntu for Smartphones

After teasing the web community with a countdown timer to its secret touch reveal, Canonical spilled the beans about what's coming next for Ubuntu: smartphones. Like Windows 8, Ubuntu is trending toward a single operating system for multiple devices, though not necessarily with identical interfaces. In fact, Ubuntu for smartphones will sport a "distinctive" interface. On tap are thumb gestures from all four sides of the screen, a global search function for apps and content, voice and text commands in any application, native and web or HTML5 apps, and evolving personalized art on the welcome screen.

The company is taking aim at two core mobile segments: the high-end superphone and the entry-level basic smartphone. With the former, users will be able to plop their Ubuntu-powered superphone into a dock to turn it into a full PC or thin client device.

Canonical says it's ready to start working with partners, with the goal of launching phones before the end of 2013. **–PL**



Google to Crack Down on Stealth Installers

If you've ever downloaded a free app to use on your PC, you're probably familiar with the uninvited browser extensions that often come along for the ride—you know, the obnoxious tool bars, search engine replacements, and, most insidious, extensions with missions completely unknown to the user. Like us, you'll probably be ecstatic to learn that Google is finally tackling the problem with Chrome 25. A new confirmation screen will give users an opportunity to approve or trash any installed extensions prior to executing.

The Chrome team claims the move will help improve the functionality and performance of the browser, but it's also a huge security bonus. The current stable release of Chrome is sitting at 23, but with new versions coming every six weeks or so, expect to see this feature rolling out automatically to users soon. **–JK**

Valve Confirms the Steam Box Will Run Linux

Gabe Newell, co-founder and CEO of Valve, confirmed in a recent interview with The Verge that the Steam box will run on a flavor of Linux. Avid PC gamers have always been tied to Windows for their gaming needs, but with Steam now supported by Linux, and Linux-based hardware on the horizon, an alternative OS for gaming seems viable. Valve showed off a couple of prototypes of its Steam box console at CES and said development began last December. Perhaps more interesting, Valve's hardware partner Xi3 is currently developing an upgradeable Linux-based Steam box called the Piston. The company says the small form-factor PC (pictured here) will sport an AMD quad-core CPU, 8GB of RAM, and integrated graphics, with a price of $1,000. **–CZ**





Tom Halfhill
Fast Forward

SHAPE-SHIFTING PCS

WINDOWS-COMPATIBLE tablet PCs appeared more than 10 years ago, but largely fizzled in the marketplace. However, the sudden popularity of Apple's iPad and similar Android tablets has reinvigorated the concept. Apple successfully sold tablets on their own merits, even if they weren't convertible into notebook PCs. Now, there's a new generation of hybrids that work like notebooks but have detachable screens that operate independently as tablets.

Of course, all tablets have optional QWERTY keyboards that would seem to accomplish the same thing. However, a true hybrid is more than a tablet with an accessory keyboard. The keyboard unit is really a docking station because it has another battery (for longer runtime in the notebook configuration) and additional I/O ports (for more connectivity than a typical tablet provides). An example is the Asus Transformer.

Hewlett-Packard's Envy x2 is an even truer hybrid. Like the Transformer, it has batteries in both the detachable tablet screen and in the keyboard, plus I/O ports in the keyboard unit. More important, the Envy x2 has an Intel x86 processor that runs Windows 8, so it's a real PC for those who need the software compatibility. In contrast, the Transformer has an ARM-compatible Nvidia Tegra-2 processor that runs Android, so it's more tablet than PC.

Unfortunately, the Envy x2's weakness is a not-so-enviable Atom processor. In its notebook configuration, it's really a netbook. That's OK for some folks—I'm still using an Atom-based HP Mini netbook that is surprisingly competent—but most people want something more powerful. And the Envy x2 costs about $850, which will definitely buy something more powerful, albeit more conventional.

To truly replace a notebook PC, a hybrid needs a faster processor or a supplemental processor in addition to the supplemental battery. Nevertheless, the new hybrids are a welcome revival of the convertible concept.

Tom Halfhill was formerly a senior editor for *Byte* magazine and is now an analyst for *Microprocessor Report*.



Thomas McDonald
Game Theory

THE SHIFTING PC LANDSCAPE

FACTS NEED to be faced, and one of those facts is that the days of the desktop box are numbered. I won't speculate on that number, but the safely generic "five to 10 years" seems as good a guess as any, and we need to figure out what that reality means. Although we're less yoked to our boxes than ever before, we're reluctant to surrender their power and flexibility, particularly for gaming. This leaves us at risk of turning into the equivalent of vinyl aficionados, extolling the warm sounds of analog and hi-fi in a world perfectly content with digital downloads and earbuds.

There will be a new paradigm for PC gaming, and we're already hearing rumblings about what that may mean. Although we know Valve is interested in a set-top box to bring PC gaming to TV, details have been scarce until recently. The rumored "Piston" box from Xi3 may just be our magical unicorn: a "console" system with the heart of a PC. Xi3's series 7 specs look pretty tasty already: an AMD quad up to 3.2GHz with a Radeon HD 7660G graphics core, 8GB RAM, resolutions up to 4096x2160, and a power requirement of only 40 watts. Put Windows and Steam on it, stick it on your TV with a wireless keyboard/mouse combo and a chunky bit of storage space, and you have the potential to totally rewrite the rules of PC gaming.

Blowing minds even more is Nvidia's Project Shield, which will allow people to play PC games on a handheld device with a quad-core Tegra 4 processor. The device shown at CES looks sort of like an Xbox controller with a flip-up screen. That's not the form factor I want for my PC games, but I can't help thinking they're on the right track.

I'm eager for this new world, and you should be, too. Desktop gaming will die (in time, so will the desk itself) and most people will not make the transition to TV/PC gaming without an out-of-the-box solution. The PC as we know it will die, but PC gaming will go on.

You can follow Thomas McDonald on Twitter: @StateOfPlayBlog.

Lenovo to Split in Two

Lenovo might now lay claim to being the world's top PC seller, according to a Gartner report from last October, but the company is making a major organizational change in April by splitting into two distinct entities. The details were laid out in an internal email by company CEO Yang Yuanqing, according to tech website Engadget. Going forward, the Lenovo Business Group will focus on the low-end/mainstream market, while the Think Business Group will promote the high-end Think brand. According to the email, Yuanqing believes the split will put the Think brand in a better position to compete with Apple. **–KS**

Intel's Web Content Plans Delayed

Intel is planning to become a major player in the world of content delivery over the Internet, or at least that was the original plan, according to reports. The only problem is that the companies that own the content are already playing hardball. The *Wall Street Journal* reports that Intel has plans to become a virtual cable operator, offering a set-top box to consumers with the goal of selling subscriptions to US TV channels over the Internet. Sources told the *Journal* the box was supposed to launch in Q4 2012, but now it might be delayed up to a year as negotiations continue. **–JN**

Razer Debuts 8.9-inch PC Gaming Laptop

Razer recently hoisted a few eyebrows with the unveiling of an all-new Windows 8 tablet—dubbed the Razer Edge—aimed specifically at PC gamers. Though it looks like most other tablets already on the market, what sets the Edge apart from the iPad, Surface, and Nexus 7 is a host of accessories that allow it to be used in different gaming scenarios. For example, you can buy a keyboard dock (pictured below) to use the Edge like a notebook ($200); an accessory dock to connect a mouse, keyboard, and larger display ($100); or a console dock that sandwiches the Edge between two vertical gamepads ($250).

The Edge will be available in both a modestly spec'd base model for $1,000, and a Pro model that includes the gamepad controller for $1,500. Its main specs include a Core i7 proc at 1.9GHz, 8GB of DDR3 RAM, a 128/256GB SSD, Nvidia GT 540M LE graphics, a 10.1-inch IPS display at 1366x768, and Windows 8 OS. Given such hearty specs, you won't be surprised to read that the Edge's battery life is rated between two and five hours. It will come with Steam's Big Picture Mode preinstalled, along with other gaming software that was not finalized at press time.

While the Edge looks great, it's got big shoes to fill, as it's trying to do the same thing as the Microsoft Surface Pro, which is to be equally effective as a laptop and a tablet. The Edge will ship in Q1 of 2013, with the accessories following in Q2 and Q3. **–JN**





Quinn Norton
Byte Rights

THE ITU POWER GRAB

THE INTERNATIONAL Telecommunications Union is one of those panoply of agencies that quietly manage the world. There are dozens of them, making all the technical bits of the planet fit together. No one knows about them—until they screw up. Who ever heard of the RIAA when it was making sure all records played on all phonographs? It wasn't until the organization was trying to crush the Internet that it became a household name.

Well, now you've heard of the ITU, and yep, it's trying to crush the Internet. For nearly 150 years, the ITU has been making sure that phones around the world can talk to each other, that everyone plays nice with radio spectrum, and recently, that satellites don't interfere with each other. But it's always been with The Man. The ITU's vision of technology is of resources handed down from the top, and culturally it's not compatible with the chaotic wild-west inventiveness of the net—of which it sees itself as the proper master. The ITU is proposing that it takes over Internet governance, standardizing how computers spy on you and what you're allowed to say through them. For repressive regimes, it's a godsend.

The way the ITU proposes that the Internet should be governed gets bear hugs from Putin; it's a vision of control and surveillance, where the net is an explicit tool of the state, however crappy your state is. Last December, the ITU took the idea that it should run the net to the nations. Seventy nations, including China, Russia, Saudi Arabia, and Argentina, voted to hand over control. Fifty-five nations, including the United States, most of Europe, and India, walked out, splitting the world in half, between a free and an increasingly authoritarian Internet. Now, we wait, and hope the scrappy kids who built the net get to keep it.

Quinn Norton writes about copyright for Wired News and other publications.

USB Speed to Triple

If Thunderbolt expected USB 3.0 to be a standing target, it was wrong. The USB 3.0 IF has announced plans to introduce a faster version of USB 3.0 Super Speed that could very well triple the speed of the interface.

Current USB 3.0 Super Speed tops out at 5Gb/s, with the new spec pushing it to 10Gb/s. The new spec, however, will also feature more efficient signaling protocols that will greatly decrease the overhead, so rather than just doubling the speed, actual throughput will be closer to triple. Thunderbolt still holds a performance edge, though, in theory. Although it's marketed as 10Gb/s, that actually applies to both directions. Thunderbolt can also scale to even higher speeds—it's just that few hardware vendors have adopted it at its current capabilities.

The changes to USB 3.0 will require new silicon on both ends, so existing USB 3.0 parts won't be able to hit the new 10Gb/s speeds, but some existing cables that are of high enough quality should work. The spec should be finalized this summer with hardware due at the end of 2014. **–GU**

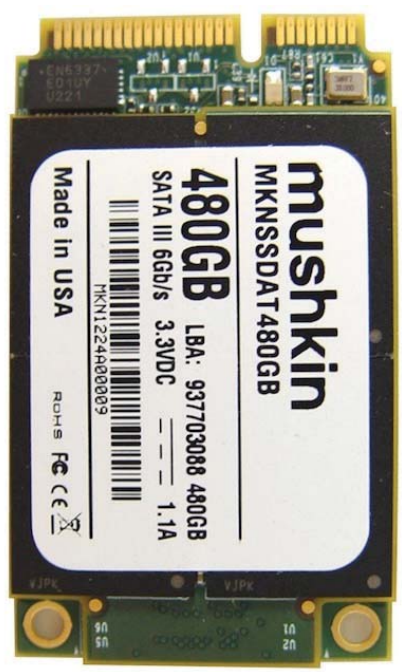
SUPER DUPER! CERTIFIED USB

Optical Media Prices to Skyrocket

According to *DigiTimes*, the optical disc industry is in the midst of a "reshuffle," in which disc makers in Japan, along with second-tier and third-tier makers in Taiwan, have all stopped producing inventory. As a result, optical disc prices are expected to jump by nearly 50 percent in the next six months, once demand catches up with and surpasses supply.

It's a move that coincides with a shrinking optical drive market—most Ultrabooks don't even ship with an ODD. Due to rock-bottom prices, Sony exited the market altogether just a few months ago. **–PL**

Mushkin Boosts mSATA SSDs to 480GB



mSATA's days as a portable-storage interface might be numbered, but Mushkin's seeing to it that the standard goes out in a blaze of glory. How else to describe the company's Atlas 480GB mSATA 6Gb/s SSD? That's nearly twice the capacity of the current top mSATA offering, on a device no bigger than a Wi-Fi card. As Brian Flood, Mushkin's director of product development, puts it: "Keeping z-height as low as possible and managing to fit eight NAND flash chips and a controller on a mSATA PCB was no easy feat, but now capacity-hungry Ultrabook and notebook users can go beyond the 256GB mSATA barrier."

The Atlas 480GB will cost $500 and should be available by the time you read this. **–KS**

THE LIST

8 BEST PC PRODUCTS AT CES

8 NVIDIA PROJECT SHIELD



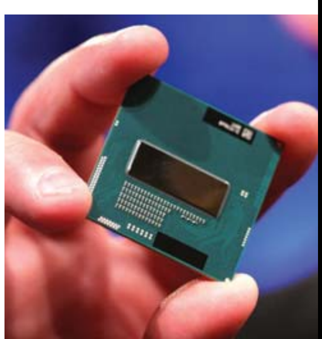
With a good controller and Tegra 4, the Shield is poised to raise the bar for Android games. The fact that you can also stream PC games to the device is icing on the cake.

7 RAZER EDGE



With its various attachments, the Edge is being advertised as a tablet, laptop, and console. It certainly looks sharp on all sides to us.

6 INTEL HASWELL CPU



Haswell's integrated graphics were nearly indistinguishable from a GeForce GT650M's running Dirt 3 on the show floor. Can we has it?

5 XI3 PISTON



The fact that Valve is working with Xi3 to create this cool, small form-factor PC is enough to make us believe this Piston is firing on all cylinders.

4 LENOVO IDEACENTRE HORIZON

The 27-inch Win8-powered tablet comes with the company's Aura software and is preloaded with sit-down games/apps for the family.



3 ASUS TRANSFORMER AIO



Asus's all-in-one allows you to easily switch between Win8 and Android.

2 USB 3.0 SUPER DUPER SPEED

USB IF revealed an update to USB 3.0 that could increase speeds by 300 percent.

SUPER DUPER!
CERTIFIED USB

1 ZALMAN FX100-CUBE FANLESS CPU COOLER



It makes absolutely no noise. The fans it has are power users.

HEAD TO HEAD

BY JOSH NOREM

LaCie XtremKey vs. Corsair Flash Survivor

Rugged USB keys are nothing new, but lately they've reached a level of badassery previously only reserved for *Maximum PC* editors and lumberjacks. We're talking supreme toughness, with hints of leather, peppered beef jerky, and English Gentleman aftershave thrown in. To see which key is the most badass we've assembled the top two candidates—LaCie's XtremKey and Corsair's Flash Survivor—and set out to discover which is the top dog. They are both USB 3.0- and 2.0-compatible, come wrapped in some form of metal, and can tolerate environments ranging from super-heated to ice-cold. We put them through their paces to let you know which key you need in your pocket the next time you're immersed in glacial waters and then set on fire. No editors were harmed in testing, of course, but these two keys certainly were.



The Corsair Flash Survivor features an aluminum chassis made from recycled airplanes, and is waterproof up to 200 meters.

Round 1: Portability and Design

The XtremKey's 2mm-thick steel chassis makes it almost impenetrable to abuse, but it also makes it semi-difficult to lug around—it's like having a small boat anchor in your pocket. At 57 grams it's porky too, so dropping it on your phone or your foot could cause some damage. The Corsair Survivor, on the other hand, is made from anodized aluminum, so it's incredibly light by comparison at 43 grams, while still being exceedingly tough. Despite its lighter weight, you could still smash the Survivor with a hammer and it would, well, survive, unscathed. Both drives can withstand a lot of punishment, but the Flash Survivor does it without weighing us down too much.

Winner: Corsair Flash Survivor

Round 2: Ruggedness

This was a tough category to thoroughly test, simply because the upper limits of the drives' endurance was beyond what was available to us. For example, the XtremKey can withstand 10 tons of pressure, but we only had a full-size truck available, and both keys passed the roll-over test with flying colors. Both drives were also baked in an oven at 350 degrees for an hour, sent through a wash and dry cycle, frozen and thawed, and thrown on the ground with all our nerd strength, and neither drive stopped working. The nod goes to the XtremKey though, since it can take more damage than the Flash Survivor due to its metal alloy exoskeleton.

Winner: LaCie XtremKey

HEAD



LaCie's XtremKey is extreme alright—in its size, price, speed, and the amount of punishment it can take.

Round 3: Software Bundle

This category is an easy win for the XtremKey since it includes a fairly sizable software bundle for a USB key, including backup software, encryption tools (TrueCrypt), and a cloud storage utility that gives you 5GB of free storage. The Corsair key, on the other hand, ships with just the key and nothing else; although, keep in mind that the Corsair key is half the price of the LaCie key, but we'll get to that in a bit. To its credit, the Corsair key works with Mac, Windows, and Linux right out of the box with no additional drivers needed, so that's appreciated. The LaCie key not only ships with software, but it's actually good software, which is surprising and helps justify the XtremKey's high price tag.

Winner: LaCie XtremKey

Round 4: Performance

This is another easy win for the LaCie XtremKey, as it has more than three times the speed as the Corsair key even though both keys are USB 3.0 rated. The LaCie key is rated to perform sequential reads at 230MB/s while the Corsair key is rated for just 80MB/s, and our benchmarks verified a massive speed differential between the drives. Using CrystalDiskMark, we saw the LaCie key read at 213MB/s and the Corsair key perform at 88.3MB/s. In a real-world 11GB file-copy test, the LaCie key took just three minutes and 34 seconds to write the files, while the Corsair key required a sluggish 13 minutes and 30 seconds, so the difference between the two keys in everyday file use is large and noticeable.

Winner: LaCie XtremKey

Round 5: Value

We're giving this round to the Corsair Flash Survivor simply because it's half the price of the LaCie key, even though it holds the same 32GB and is rugged enough for the average card-holding geek. We bought our key for just $40 from Amazon, so it's actually less than half the LaCie key's $85 asking price. Sure, you get some great software with the LaCie key, and a little extra ruggedness, but the biggest advantage the LaCie key has over the Corsair is its blazing speed. That is something worth paying for, but not at twice the price. The Corsair key also has a five-year warranty, and the XtremKey just covers you for three years.

Winner: Corsair Flash Survivor

And the Winner Is...

Before we started this test, we had the Corsair Flash Survivor pegged as the key we'd spend our money on since we figured it was probably rugged *enough,* and it costs half as much as the XtremKey. Now that testing is complete, however, we've reversed ourselves, and declare the **LaCie XtremKey** the winner. Not only can it theoretically withstand more punishment than the Flash Survivor, it includes a full-fledged software package, and was more than twice as fast in our tests as the Corsair key. It's big and heavy, and yes, it's expensive, but it's the full package whereas the Flash Survivor is simply a little too bare-bones in comparison.

DOCTOR

THIS MONTH THE DOCTOR TACKLES...

> Long-Overdue Upgrades
> Two-System Cases
> DHCP Problems

Upgrade or Toss?

My mother has been using the same Dell Inspiron (P4 2.8GHz) for the past 10 years, and she refuses to upgrade. I've already boosted the RAM from 1GB to 4GB (3.3GB with 32-bit Windows XP), swapped the puny 80GB HDD with a 500GB drive, and tossed in a DVD-RW drive. Then, for Christmas, I got her a 24-inch LCD monitor, but the Dell is so old, the resolution caps at 1024x768.

Should I swap that old Dell with a $400 rig, or try throwing a discrete graphic card on the decade-old board? Any recommendations for a mother who watches *a lot* of Netflix and DVDs? I want to get her watching Blu-ray, just so she can see the difference.

—Morgan Kuehl

THE DOCTOR RESPONDS: While it's possible to get an AGP or PCI graphics card that will enable Blu-ray playback on that old system, you'd be throwing good money after bad, in the Doctor's estimation. Better to spend $400 or so on a system based on AMD's new Trinity APU, which will give you great HTPC performance, including Blu-ray and Netflix playback, without the need for a discrete GPU.

Hell, the Doc hates to say this, but a PlayStation 3 can play Blu-ray and DVDs and has a Netflix client built in and costs around $250. So if that's all she uses the computer for, you might as well just save some money and get one of those.

Win8 Without Touch

I am getting ready to put together a new PC—the first in a very long time. My current box is a Pentium 4 in a Socket 478 motherboard running XP Pro. Should I install Windows 7 or 8? I don't need or want a touchscreen, so does Win8 work well without one?

—Robert Weber

THE DOCTOR RESPONDS: Windows 8 works fine without a touchscreen. It's the Doctor's opinion that a new Windows 8 laptop should have a touchscreen but a desktop doesn't need one. On a desktop, your hands are much farther from the screen, so the reach-up-and-swipe motion that works fine on a laptop doesn't work as well on a desktop.

As for which OS to use, the Doctor has to recommend Windows 8. It's slightly faster than Windows 7 on the same hardware, and if you end up hating the Modern UI interface you can always avoid it and spend most of your time in the desktop (which the Doctor does), or in extreme cases you can use software like Classic Shell (free, www.classicshell.net) to disable it entirely. In the Doctor's opinion, the Start interface is fine if you use it as a Start menu and annoying if you try to use it for anything else.

Water-Cooling the HAF

I'm currently running a reasonable system in a Cooler Master HAF X. I want to add an all-in-one liquid-cooling loop like the Thermaltake Water2.0 Pro or Corsair H80. The reason I write is this: The rear fan on the case I have is 140mm; everything else on the case is 200mm or 230mm. I've been looking around, and I can't see any prebuilt water-cooling system that can match these larger fans. I've seen some adapters, but the reviews on them say that they'll hold a case fan, but that's it. So, I'm hoping that you can either lead me in the direction of a viable solution, show me something in my case that I've completely missed (like some holes in the top of the case that are pre-drilled to handle the radiator), or just tell me honestly that I'm hosed, and I'll drop it.

—Luc

THE DOCTOR RESPONDS: The rear fan mount area on those HAF series chassis should have a second set of fan-mounting holes that will accommodate 120mm fans. All you need to do is remove the 140mm fan and install the fan/radiator there. Alternately, you ought to be able to use a 240mm radiator, like that on the Corsair H100 or the Thermaltake Water2.0 Extreme, at the top of the case if you remove the stock fan there. You'll see mounting holes for 240mm and 360mm radiators at the top once the fan is removed.

DHCP Drops

I'm using a D-Link Dir-855 router and several months ago I started having problems connecting to websites after being logged in anywhere from 20 minutes to the better part of a day. I can resolve the issue for the short term by dropping my Internet connection via the router web interface and then re-establishing it. Comcast seems to think I need to make changes to my browser configuration due to some problem affecting Windows PCs, but this affects every device on my network including my iPhones when connecting, and for both wireless and wired devices. I thought that it might be a DNS problem for a while, as I can access sites if I use an IP, but then started thinking it was more likely to

↘ submit your questions to: doctor@maximumpc.com

be a DHCP issue.

My network skills are tapped out at this point. Are there any techniques for determining an actual cause of the problem? If I understand what I've read, my Dir-855 handles the DHCP duties. Could it have gone bad? I don't want to have to replace the router if I don't have to, but this problem is annoying.

—Michael K. Craghead

THE DOCTOR RESPONDS: It does sound like a DHCP issue. You've mentioned that you already know how to log in to your router's web configuration panel, so do that and go to the configuration panel. Go to Network Settings and then DHCP settings and make sure that you have the DHCP server setting enabled and that you have enough IP addresses reserved for devices. Set the range to be something like 192.168.0.100 through 192.168.0.199.

Right under that you should see the option to set your DHCP lease time in minutes. Set this for a large number, like 10,000 minutes (if available). This is just short of a week. See if that helps. You can also try setting static IP addresses for each device by using the DHCP Reservation list.

You did mention that you can still get to websites via the IP address. You could try changing your DNS servers from the ISP's to Google or OpenDNS to see if that improves the situation. Go back to Settings and write down the DNS addresses you see under Primary DNS and Secondary DNS Server so you can change them back if necessary. Google's DNS servers are 8.8.8.8 and 8.8.4.4 and OpenDNS's are 208.67.222.222 and 208.67.220.220. Pick a pair and see if that resolves the issue.

SSD or HDD for Me?

I'm about to purchase a new desktop based on what *Maximum PC* has taught me over the years, but can't decide between SSD and HDD. I primarily use my desktop for email and Internet use. However, I'll also use it to edit HD video and create DVDs/Blu-rays.

I hear SSDs are less desirable for video editing since they run low on program/erase cycles over time. But won't I be fine if the OS is on the SSD and data is kept on a second (HDD) drive? In other words, will the video editing software go easy on the SSD since all the data is elsewhere? Also, does video editing require a robust video card, or can I get by with an entry-level card?

—Ian

THE DOCTOR RESPONDS: You should be perfectly fine running an SSD in your box and the Doctor recommends it based on your computing needs. There's really no reason to lock yourself out of the joy of an SSD today. You shouldn't worry about the program/erase cycles on a modern SSD, as you will likely toss out the drive or retire it before you ever wear it out. As for getting a beefy GPU for video editing, the Doctor would recommend a good GPU for any machine that will do more than light-duty video editing—just make sure you get a card that your video editor will support. You should be able to get this information by checking out the recommended hardware for the video editor you are using. These days, it tends to be Nvidia cards that support CUDA. If your video editor does not (even consumer video editors do these days), then you can go with integrated or a low-end GPU.

Received via Fax

I have two PCs, one running Windows XP and the other Windows 7. This also means I have two cases and they both take up room under the desk. I want to know if there are any cases that will hold two OSes with MB (and associated components). Both have two SATA HDDs and two DVD writers. I can give up two writers but need all four HDDs.

I keep XP because it is the only OS that will run Symantec's WinFax. I had tried running it in WinXP mode with VMware but VMware doesn't see my modem (important for faxing). Windows Fax and Scan is very limited for what I need a faxing suite to do.

I plan to keep XP as long as possible, so a case holding two of everything is needed. I don't mind upgrading the XP's motherboard to a mini/micro just as long as it can handle two 1.5TB SATA hard drives and one DVD writer.

My other option, which is probably just a dream, would be a way to use the XP HDD and the Win7 HDD in the same case and just switch back and forth. They would need to be running at the same time, so it would be like booting into two different PCs, just all in the case controlled by one motherboard. Any ideas?

—Cassandra

THE DOCTOR RESPONDS: The Doctor understands, running a fax-spamming business takes work. Just kidding. Since you basically need two PCs in one, check out Azza's Fusion 4000. The case lets you run a full-size system down below and a second Mini-ITX system up top. It should have the room you need for the hard drives, too. The only real problem is that you may not get it under your desk because it's so tall, so you might have to put it next to your desk, instead.



The Azza Fusion 4000 has room for an XL-ATX motherboard on the bottom and a Mini-ITX rig on top, perfect for your multiboxing needs.


CORSAIR

NEW RIG DONE RIGHT

ESSENTIAL FIRST STEPS FOR BREAKING-IN A NEW PC

BY GORDON MAH UNG AND DAVID MURPHY

All expecting parents have read *What to Expect When You're Expecting*, because when that little bundle of joy drops out of mommy, you'd better be ready with lots of paper towels and a whole lot of specialized knowledge about what to do from that moment forward. Though it's not quite as messy (or scary), a new PC requires a similar sort of informed approach if you want to raise it properly from the moment it squirts out of the Fed Ex truck and into your life. You'll be tempted to pick it up and coo, "Whose a widdle PC?," and then immediately benchmark the shinola out of it. We understand the impulse, and the excitement, but hold your horses, cowboy. You've got to take it slow with a new rig, and get it set up correctly the first time, or else all your future efforts will be for naught. That's where we come in.

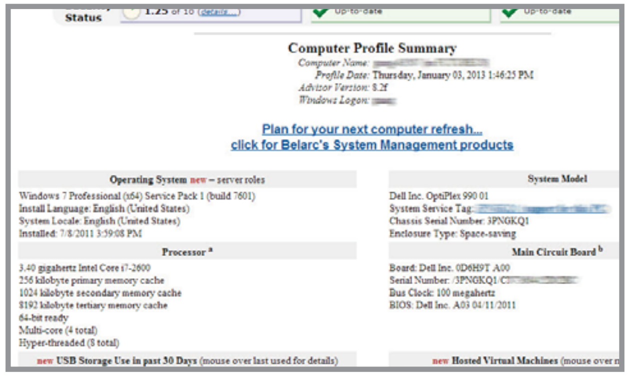
In this handy guide, we'll show you what to do with your new PC in those first crucial out-of-the-box moments, and will hold your hand all the way from the first boot until the PC is ready to run its first benchmark. With our help, your bundle of bits will quickly grow from a fragile, schizophrenic rig to a fully up-to-date, crap-free machine that's secure, tweaked for maximum performance, and ready to make daddy or mommy proud. Sniff—they boot up so fast!

KICK THE TIRES

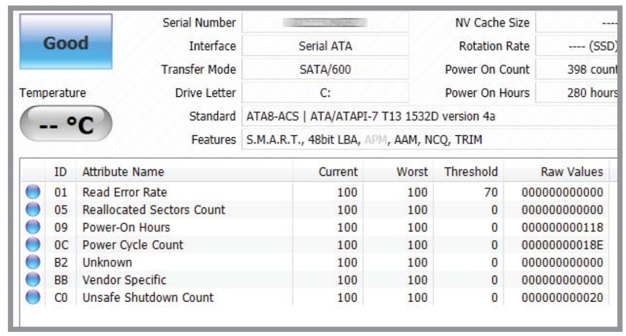
You just unboxed your new desktop, all-in-one, or laptop, but do you really know what's inside of it? After all, like doctors, lawyers, and journalists, system builders make mistakes, too. It's a good time to grab the spec sheet that came with your PC and do a quick system inventory to make sure that if you paid for a machine with a $230 CPU, you actually got that CPU. You can poke and prod through the specs using tools such as CPU-Z (www.cpuid.com) and GPU-Z (www.techpowerup.com) and check the Device Manager and BIOS/UEFI for hardware IDs, or just run a system audit using Belarc Advisor (free from Belarc.com). Belarc Advisor will query the hardware and software in your PC and present you with a tidy list of everything that's installed. Pay particular attention to what CPU is your box, the SSD and HDD models and capacity, as well how much RAM and how many DIMMs are installed.

The inventory isn't enough, though. You should also verify some key parameters to make sure your box is running at speed. Run CPU-Z while also running the Prime95 (www.mersenne.org) stress test in order to record the clock speed the chip is running at. With various turbo techs being pushed, you might also want to see how your chip performs under light loads. We generally run the Sunspider browser benchmark (www.webkit.org) to try to coax turbo speeds out of our CPUs. While you have CPU-Z running, click the Memory tab and verify that your box is running the correct memory channels.

Those of you running an SSD on an Intel system should verify that the drive is hooked up to a SATA 6Gb/s port and that Trim is enabled. Just download Crystal Disk Info (http://bit.ly/UKzt0) to see what state your SSD's run state.



Inventory your PC's hardware with Belarc to make sure you got what you paid for.



We like to verify that a new SATA 6Gb/s SSD is actually running at that speed.

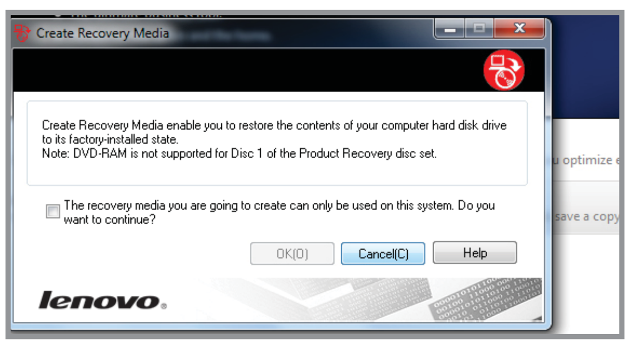
RESTORATION SOFTWARE

Old-timers, aka geezers, will remember when every new PC would ship with a set of restore discs. Well, buddy, those days are over for most large PC manufacturers. And don't you kid yourself; even though Windows 8 has the capability to factory reset itself before your lunch break is over, the need for restore media persists. Windows 8's reset feature won't do squat if your HDD or SSD decides to go south on you, or if some OS fault or infection is so bad you need to nuke it from orbit.

It's not that Microsoft is preventing PC vendors from providing restore media, either—it's just that most PC OEMs don't want to pay for it anymore. Why bother if they can make you burn it instead? To be fair, the vast majority of folks never have issues and skip this step. We, however, like to hope for the best but plan for the worst, so burning the disc before your drive blows a motivator is the proper course of action.

Every major OEM seems to handle restore discs differently, so hunt around on your system for the utility and look for the "factory restore disc" feature. When we set up a new box for Aunt Peg recently, the first thing we did was burn a set of restore discs and then taped them to the back of the machine.

If your new notebook doesn't have an optical drive, consider creating a recovery USB key, which most factory utilities support as an alternative to creating discs. Just make sure it's big enough. A Windows 8 Pro installation asked for a minimum of 23GB for our factory image.



Take the time to create factory recovery discs, since few systems ship with them.



Interestingly, miserly HP allows you to create only one set of recovery discs.

THE NUCLEAR OPTION

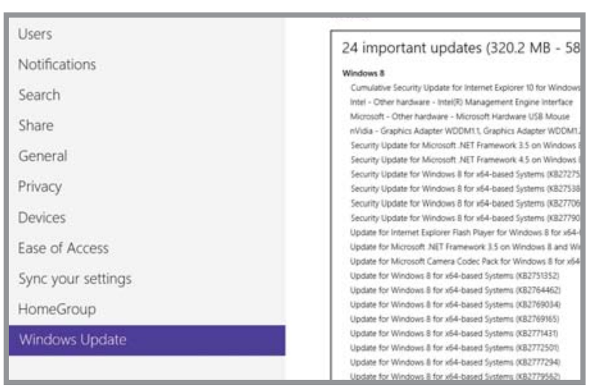
Rather than trying to remove the megabytes of trialware your OEM has preloaded on a new machine, some enthusiasts prefer to forgo the hour spent uninstalling unwanted crap and reach right for the nuclear launch codes instead. Yup, that's right, they take a perfectly good, brand-new PC and immediately nuke-and-pave over the OS with a full, clean install. In the days of Windows XP, such an option probably made a lot of sense, but factory preinstalls of the OS from large OEMs are quite complicated and messy. What's more, the factory-restore will quite likely contain all the same trialware. While nuking the OS from orbit was perfectly acceptable to many of us years ago, these days we think it's just easier to declutter the box by hand first (see page 26).

Still, there are times when the nuclear option is preferable. Some OEMs prefer to ship with a 32-bit version of the OS installed for compatibility reasons, but make both the 32-bit and 64-bit versions available. In this case, nuking the OS and reinstalling the 64-bit version is required if you want to upgrade.

WINDOWS UPDATE IT!

With your new PC connected to the Internet, the absolute first thing you should do is manually run Windows Update. Once it's done, run it again. Why? It's not because Windows 7 and Windows 8 are particularly soft targets, but as the world's dominant operating systems (well, Win7 anyway), they're basically the biggest targets around. With the dangers of infected Flash ads, JavaScript exploits, and an untold number of threats poised to attack unpatched machines, wading into the Internet with an unpatched box is about as wise as running buck naked and blindfolded into a cactus patch.

So before you step one foot onto the Internet, run Windows Update at least twice—some updates require the presence of a preceding update in order to be installed. Then you can run out to procure the other much-needed utilities and tools for your new PC. On Windows 8 machines, go to the Modern UI and start to type **update**. On Windows 7, go to Start and search for **update**.



Once your networking is up, run Windows Update immediately.

IF IT'S BROKEN, FIX IT

Former *Maximum PC* columnist Alex "The Saint" St. John said it best: "Drivers, she is always a-broken." OK, we added the Mario Brothers' sentence structure and accent for style, but he was right on. Drivers are usually a work in progress and they are often the cause of system wonkiness, even on brand-spanking-new machines. In fact, new machines are often the ones most in need of updated drivers, given their state-of-the-art hardware. Case in point, we unboxed a brand-spanking-new Windows 8 notebook for some testing and immediately had to update no fewer than four drivers.

This is where the big-boy "tier 1" OEMs often have the edge over the smaller companies. Most pack their own driver update applications that will hunt down the latest drivers for their machines. On an HP Win8 laptop, for example, rather than having to chase down individual drivers, the HP update app did the work for us. This can work against you on occasion, though, as big companies often don't want headaches, so once a driver reaches a certain level of stability, they don't push new updates unless absolutely needed, even if the new driver may add improved features or performance. Then, a manual search will produce more satisfying results.

If you don't want to hunt for every single device driver by hand, there are alternatives, such as Slimware's SlimDrivers Free (www.slimwareutilities.com). This utility uses "crowd-sourcing" to do what the large OEMs do with their driver updaters. Running SlimDrivers Free on another big OEM laptop, for example, yielded 14 updated drivers, while the OEM's update tool said nothing new was available.

Which drivers do we typically recommend that you update on a new box? The most obvious are GPU drivers. Next up would be chipset drivers. We will add that results of driver updates will vary depending on your OS. Windows 7 is quite mature and drivers at this point are unlikely to add much beyond bug fixes. Windows 8, though, is constantly changing, so GPU, chipset, audio, USB, network—basically everything—should be checked for new drivers and generally installed.



Take advantage of integrated driver-update tools on your PC.



Slimware's SlimDriver Free hunts down new drivers for you.

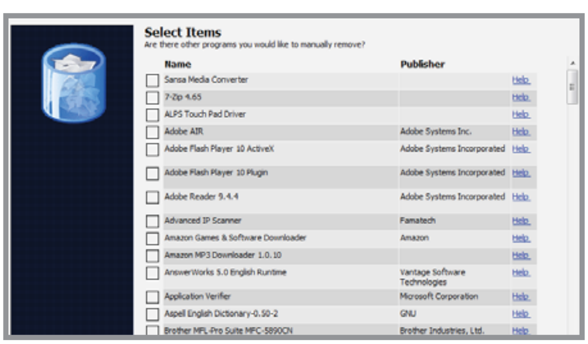
BEWARE THE BIOS

We used to believe the conventional wisdom that if it ain't broke, don't break it by touching it, but not anymore when it comes to the BIOS. We've experienced so many fits of weirdness that were fixed by updating the BIOS in the last couple of years that we now recommend updating the BIOS/UEFI as a top priority on a new PC. We've seen Wi-Fi that wouldn't install properly get fixed with a BIOS update, and overclocking-gone-whacky similarly remedied, so we say just do it. Even on notebooks, which many people believe don't need a BIOS update, an updated BIOS can correct serious performance issues. Case in point: The BIOS often has direct control over acoustics on a laptop. Updating the BIOS could add new fan profiles that either make the laptop quieter or enable higher turbo clock speeds because the fan will spin up higher. You simply don't know. Even more interesting, newer machines, especially new laptops, often benefit the most from BIOS updates, as the engineers tweak them in response to the feedback they're getting as the products actually reach consumers' hands. Since BIOS updates are often handled differently for each PC, we can't walk you through it step-by-step, but we recommend that you visit your vendor's website to check the BIOS versions and/or run any built-in update utility to check for a new BIOS.

LIGHTEN THE LOAD

Do you know how you got your PC at such a fantastic price? Well, it's partly the result of the preinstalled and subsidized trial software. So while you gnash your teeth at the 12 trial apps clogging your hard drive, remember those same software vendors helped pay for your new rig.

So please mouth a quiet thank you and then download PC Decrapifier (www.pcdecrapifier.com) stat. This handy utility will let you quickly and easily uninstall most of the preinstalled software in one single swipe. And after you're done blowing out the hundreds of megabytes of trial software with as much effort as it takes you to eat a delicious Big Kahuna burger, also thank your PC for even letting you uninstall the trialware, unlike your blasted smartphone, which has precious, precious space being wasted by trial apps you never, ever use, either. Freedom!



We love how easily PC Decrapifier makes it for us to bid adieu to unwelcome preinstalled software!

CLUTTER IT UP

You just spent an hour decluttering your new PC of trial applications (if you didn't use PC Decrapifier), now it's time to clutter it up—your way. Rather than download each app one-at-a-time, point your browser at Ninite.com. Once there, you're presented with a page of popular applications that just about everyone installs on a new machine—Chrome, Dropbox, Foxit Reader, 7-Zip, Steam, TeraCopy, Revo, Digsby, VLC, etc. Simply scroll through the list looking for an app, utility, or runtime that appeals to you and check the box. Once you've picked from the menu of software, click the Get Installer button and you'll get a small executable to download. Once you've downloaded the executable, run it, and Ninite will automatically download and install the software you selected. Just drive on down to the In-N-Out Burger near Radford, grab your lunch, come back, and voilà, it's done. The only improvement we wish Ninite had is an enthusiast utility selection that includes CPU-Z, GPU-Z, and other handy-dandy tools we all use.

While we're on the subject of installing software, if you're planning to install free antivirus software, you can do that as well with Ninite, which gives you the choice of Microsoft Security Essentials, Avast, and AVG for real-time scanners; and Malwarebytes, Ad-Aware, and Spybot as secondary, on-demand scanners. SuperAntiSpyware is also an option but the app has real-time protection, which may be an issue for any AV app you run. More on this later, but if you're going the cheap route with AVG, MSE, or Avast, now is the time to do it, or install a paid solution. For your info, Windows 8 boxes come out of the, um, box with Microsoft's creaky-old Security Essentials installed and running.



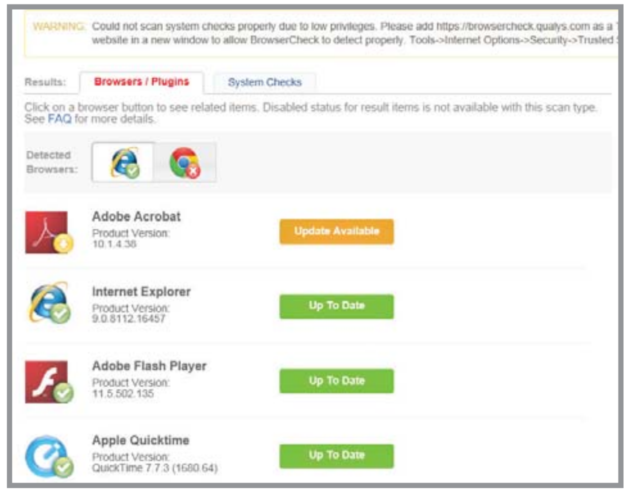
Ninite.com automagically installs all your popular apps and utilities in one swoop.

SECURE IT

Your work is just getting started after you've installed an AV product. The old-school scan-your-drive-for-an-infected-file model has long been worthless. These days, malware often is installed in a nanosecond, using zero-day infections via broken browser plugins and scripting exploits. As much work as Microsoft has done to enhance security in Windows 15 (7 + 8), that doesn't help if you have an unpatched version of QuickTime, VLC, or Adobe Reader.

First, may we recommend that you consider paying for a good AV product such as F-Secure, Kaspersky, Norton, or BitDefender, among others? These products are highly rated for their ability to intercept zero-day attacks, and with rebates you can get enough keys to cover all your devices for a few dollars a year. If you're too cheap, consider using AVG Free, which is better at stopping zero-day attacks than Microsoft's Security Essentials product. MSE is the least bothersome, but it's lost a lot of luster of late.

With a proper AV app in place, you now need to be wary of your browser plugins. We recommend weekly checks of your browser using Qualys BrowserCheck (browsercheck.qualys.com). This free web tool will check your browser's plugins to see if they're the latest available. The intermediate and advanced options offer checks of all browsers as well as Windows Updates, too. Keeping your applications updated is also a key to avoiding infections. For that, we turn to Secunia PSI or the web-based OSI (www.secunia.com). Secunia's tools will check your installed apps and inform you if there are any risks, and either automatically download them or offer you a download link.



Staying on top of the state of your browser plugins is key to a good security regimen.

Running two AV apps is not recommended, but keeping one around for a second opinion isn't a bad idea. We often keep Malwarebytes installed just in case we need it. You should also consider installing VirusTotal Uploader (www.virustotal.com). This lets you right-mouse-click a file to have it sent to VirusTotal where it will be analyzed by more than 40 virus engines. Even more trick, if you suspect a process is mal, you can use the VirusTotal Uploader to send the executable that is running the process to be analyzed.

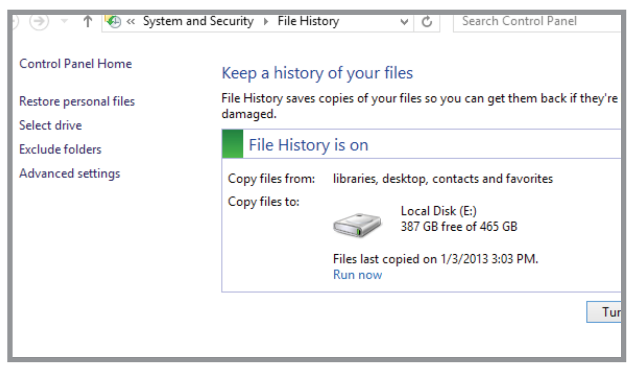
This is only the tip of the iceberg. Just remember security guru Bruce Schneier's words: "Security is not a product; it's a process."

HAVE A BACKUP PLAN OR TWO

The system-restore discs you created earlier will get you back in business should you experience a total meltdown, but you should also strongly consider setting up a backup plan now, not a day after your drive has died and you've lost all your data. For those times, we've found Window 7's Backup and Restore to work amazingly well. You'll need a second drive on the machine for the backups; we highly recommend that its capacity is equal to or larger than that of your primary drive. Remember to heed the warning that one is none and two is one.

With a USB optical drive plugged in or a second HDD in place, use Backup and Restore to create a system image, and then burn a boot disc that you will need should your drive fail. Now, also set up a file backup from your primary drive to your secondary drive and set it for a schedule that you're comfortable with. In the event of a primary drive failure, just replace the drive, boot to the restore disc you created, and point it at your backup images and files. When completed, you should be back in action with access to the files you had just before the failure.

Windows 8 users can set up the same file and image backup system from Windows 7, but it's called Windows 7 File Recovery. Just pull up search and start typing **file recovery** and look under Settings to access the same utility. Win8 actually has different options: File History will create backups on a file every hour, whereas Windows 7 File Recovery will run only once a day. What's better? Since our time and data is invaluable, we do both. File History is the Omega 13 of backup that lets you, say, go back to a file version from three hours before. Refresh is a great feature that "resets" the OS but it won't help if the drive has died. In that case, having a disc image and Windows 7 File Recovery backup set lets you drop in a new drive and be back up and running in a couple of hours, rather than the usual 12 hours of manually installing apps and recovering settings.



Not to be confused with the Windows 7 File Recovery, Win8's File History makes hourly backups of your document files.

TRANSFER YOUR DATA

Best practices for moving files from your old PC to a new one

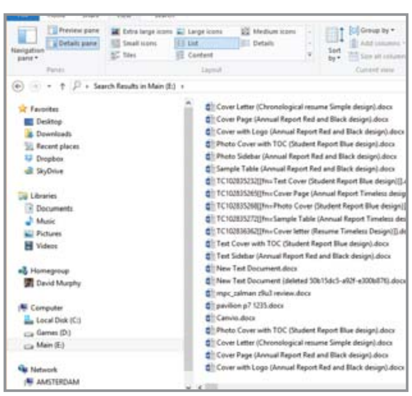
Once your system is set up how you like it, it's time to fill your fresh drive(s) with all your documents, music, and games. Follow these instructions for getting those various files situated in their new digs.

HOW TO TRANSFER... DOCUMENTS!

So, you have your new Windows 8 PC all ready to go. The problem? All of your important documents are stuck on your older system.

Assuming that you've been making ample use of Windows' My Documents folder to store just that, then transferring your files over is as easy as copying your entire C:\Users\[your name]\My Documents folder to a flash drive (or USB-based hard drive, depending on how much you'll be transferring). Connect the key or drive to your new system and copy the files over—it couldn't be easier.

If you're a bit messier, however, and have documents strewn all around your hard drive, then you'll probably want to make use of Windows' built-in search tool to find your documents. Assuming you're on Windows Vista or later, you just have to pull up Windows Explorer, highlight your Computer in the left-hand sidebar, and type ***.doc*** in the upper-right-hand search box—assuming,



Lesson learned: Keeping all of your documents in one place makes it much easier to transfer them over to a new desktop or laptop at some point in the future.

of course, that we're talking about .doc or .docx files. Sort the search results by Type to ensure you're looking at just your documents, and then highlight and copy them over to your external storage in the same way you'd transfer any file.

You also might want to investigate the free app TeraCopy (download.cnet.com) if you're likely to be copying a ton of small files over to your external storage for transfer. While the third-party file-transfer app has proven to be a bit slower than Windows' built-in transfer tool for big files, it's a star for smaller files. Additionally, it also gives you the ability to pause your transfers (similar to Windows 8's file-copy tool), skip transfers that you've queued up, and have your computer automatically shut down once the transfer has finished.

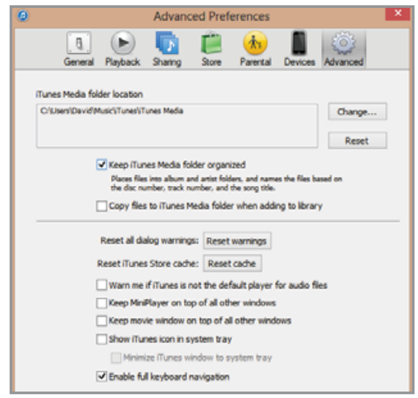
HOW TO TRANSFER... iTUNES!

We'll pause for a moment while your fellow *Maximum PC* readers look at you with suspicion, you iTunes fan you. Now that that's over with, we'll show you how to move your iTunes library to your new Windows 8 PC.

First off, you'll want to find your iTunes Library. To note: We're assuming you're using iTunes itself to organize your music, as any tunes you drag into iTunes' interface are automatically copied and placed into a specific location by the program. If not, you're on your own to hunt down where on your computer you've stashed your MP3 files. (Try using the same process we just described for Documents to get all of your MP3s onto a single piece of external storage.)

Pull up iTunes' Preferences windows and click its Advanced icon. iTunes will tell you exactly where it's keeping its Media folder. Navigate to this location within Windows Explorer and copy all the directories representing your music to some kind of external storage device.

Before you go dumping these tunes onto your new Windows 8 PC, download and install iTunes, and then head back to the same Preferences > Advanced window we just mentioned. Make sure the location you want iTunes to use for your new Media



iTunes' ability to automatically organize your music library folder is an invaluable tool when it comes to moving your music around. In other words: Don't just copy your music in File Explorer!

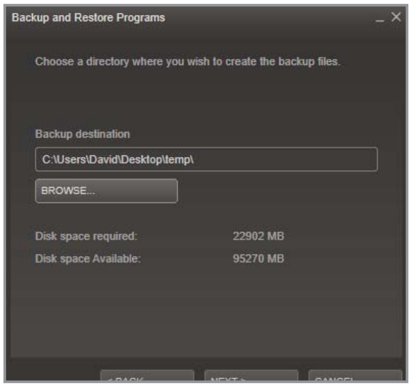
folder is set, and check the following two options: "Keep iTunes Media folder organized," and "Copy files to iTunes Media folder when adding to library." From there, all you have to do is drag-and-drop the folders full of music on your external drive directly into your new, empty iTunes folder on your Windows 8 PC—the app will take care of the rest.

HOW TO TRANSFER... STEAM!

Do your poor router a favor—don't just redownload all of your games onto your new PC. You don't have to, thanks to Valve's built-in backup feature within Steam.

Click the Steam menu in the upper-left corner of the app and select "Backup and Restore Games." Since you'll be moving all of your downloaded games from your old PC to your new one, make sure that "Backup currently installed programs" is selected in the window that appears and click Next. After that, select your games and click Next.

You can directly create this backup on your external media, but it might go a little faster to just find a temporary location on your hard drive (assuming you have the space) for now, and then copy over the



In the olden days, there was no way to just transfer Steam games via the app itself—you had to re-download everything you wanted to play (after walking miles in the snow to do so).

Steam backup to external media after the fact. Click Next and you'll be given the option to assign your backup a name and file size—in other words, the size of the (possibly many) archives that Steam will create, if you're going to try to burn these to discs instead of just copying them en masse to removable storage. Click Next and go find your favorite movie to watch—this might take a while.

Once Steam's Backup and Restore program finishes, you can copy these files to an external drive and use the same process—but selecting Restore this time—to transfer these games over to your new system.

HOW TO TRANSFER... GAMES!

There's really only one tool that we trust when it comes to scanning our systems for our games' many different save files: the freeware app Gamesave Manager (www.gamesave-manager.com). Using this one is simple—heck, you don't even have to install it. Download the app and fire it up, and make sure you've updated its database to the most recent version (this is how the app figures out where your save files are).

From there, click the "Make a backup" link on the app's main screen. Select the games whose saves you want to back up, and then click the icon in the upper-right corner that looks like a file "wooshing" to the right (it's next to the big "X" icon). Pick a location for your backup file and let 'er rip—we recommend placing the saves on some external storage device.

Once you've finished reinstalling (or Steam transferring) your games to your new system, use Gamesave Manager to restore your saves by clicking the Open Archive(s) option on the app's main screen. Hunt down the files you previously created with Gamesave Manager (on the external storage device, we hope), and use that same oddly shaped file icon to restore your precious game progress.

CONNECTION SPEEDS COMPARED

What's the best way to transfer your files from one PC to another? Easy: drag-and-drop. OK, there's a bit more to it than that.

Researching all the theoretical maximum speeds of various connection types is easy. Trying to gauge just how they'll perform in a real-world environment is a bit trickier, given the multitude of factors that go into getting your files from Point A to Point B. And by factors, we really mean "bottlenecks."

It's time you accepted the honest truth: Your file transfer speeds will never be as fast as your research suggests. Your USB 3.0 connections aren't going to blaze by at 640MB/s (or soon, 1,280MB/s, once the connection standard is bumped up to 10Gb/s), nor will your Gigabit network cough up 125MB/s each and every time you go to copy a file over to your network storage device.

So just how do some of the more popular connections for file transferring stack up in a typical, real-world scenario? Spoiler: Not exactly as you might think.

A SATA 3 (6Gb/s) connection won big on our read and write tests of a single 6.01GB file (copied between a Samsung 830 Series SSD, our system's boot drive, and an OCZ Agility 3 SSD). In second place, however, was the Gigabit Ethernet transfer of that same file between our desktop PC and an Iomega StorCenter PX2-300d-2 NAS box (onto its RAID 0 array of two 2TB Hitachi Ultrastar drives).

Why didn't our USB 3.0 file transfer between our desktop's SSD and a USB 3.0–friendly Corsair Flash Voyager drive—with a theoretical connection speed much faster than that of Gigabit networking—win out by a landslide? A few thoughts on that: Our Gigabyte GA-Z68X-UD3H-B3's USB 3.0 controller or associated driver might not be up to snuff, but it's more likely that our flash drive itself is the performance bottleneck. Based on reports of other users' experience with this flash drive, the approximately 40MB/s transfer speed that we were topping out at seems reasonable.

And, to note, it took quite a bit longer to write our test file to our flash key via USB 3.0 than it did to read off it. A similar discrepancy appeared when copying the file between our two SSDs, a clear example of the differences between read and write performance across your file transfers. In other words, you can't necessarily freak out because files heading in one direction appear to be going slower than you might expect; try it the other way, too.

Our test transfer across USB 2.0 was the tortoise in our transfer race, and we look forward to the day when this legacy connection standard is finally put out to pasture.

So, what's there to learn from our crude look at file transfer performance? It's not the connection you have to be as concerned about as it is the devices involved in the transfer. The storage—flash or mechanical—that you're using on both sides of the transfer plays a big role in the performance you'll experience when you go to copy files. SATA 6Gb/s and USB 3.0 are plenty speedy, but only when both sides of the transfer play along.

INTERFACE COMPARISON

SATA 6Gb/s	SATA 6.0 Gb/s	USB 2.0	USB 2.0	USB 3.0	USB 3.0	Gigabit	Gigabit
Samsung 830 Series SSD to OCZ Agility 3 SSD	OCZ Agility 3 SSD to Samsung 830 Series SSD	Samsung 830 Series SSD to Corsair Flash Voyager	Corsair Flash Voyager to Samsung 830 Series SSD	Samsung 830 Series SSD to Corsair Flash Voyager	Corsair Flash Voyager to Samsung 830 Series SSD	Samsung 830 Series SSD to Iomega StorCenter PX2-300d-2 NAS box	Iomega StorCenter PX2-300d-2 NAS box to Samsung 830 Series SSD
27 seconds	29 seconds	207 seconds	182 seconds	156 seconds	77 seconds	94 seconds	61 seconds

Chart shows time it took to transfer a 6,154.24MB file between the respective two devices.

MAKE WINDOWS 8 WORKABLE

A little bit of tweaking goes a long way



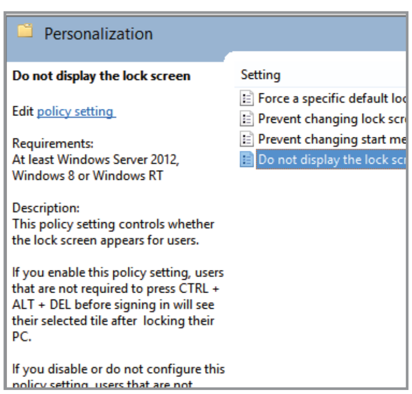
All right, all right—we get it. We're not going to take potshots at Windows 8. That's too easy. The fact is, most any new PC you buy is going to come with Windows 8 installed, so the task now falls to us to show you how to make the most of it. And the fact is, there's a lot to like about the new OS, once you get it tweaked and optimized. Here's how.

BYPASS THE WINDOWS 8 LOCK SCREEN

Little is more frustrating than having to click or keyboard-press yourself out of Windows 8's lock screen just to pull up your password prompt. Sure, it just takes a key to do so, but you'll be amazed at how annoyed you get with this additional step between you and your official login screen—especially if you're rocking Microsoft's new operating system on a non-touchscreen-friendly device.

To ditch the lock screen once and for all, you'll need to change a small setting in Windows 8's Group Policy Editor. Type **gpedit.msc** on your Start Screen (the Modern UI interface, in other words) and pull up Group Policy Editor by clicking the related icon. Surf on over to this section: Computer Configuration > Administrative Templates > Control Panel > Personalization. Once there, you'll want to find the policy labeled, "Do not display the lock screen."

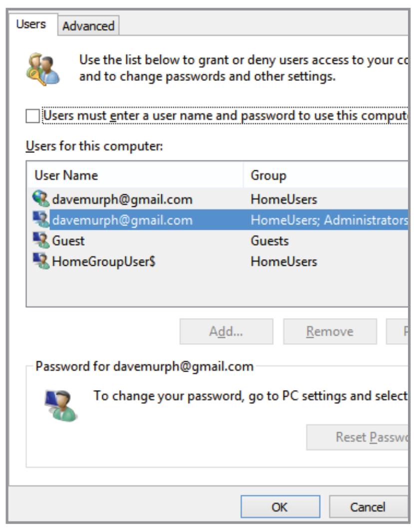
Double-click it and set the radio button in the upper-left corner of the window to Enabled. Voilà—no more lock screen, and you're one step closer to logging into your desktop or laptop PC.



There are plenty of options worth playing with in the Group Policy Editor—a powerful tool for bending Windows 8 to your iron will!

BYPASS LOGGING IN ENTIRELY

Either you're the sole user on your PC or you trust your roommates a great deal.



One caveat: If you have multiple accounts on your system, Windows 8 isn't going to wait for you to pick one to log into (sans password) when you boot your system.

Regardless, you live your life on the edge and can't bear the thought of wasting time typing in your Microsoft account password or Windows 8 PIN—or drawing lines all over your Windows 8 picture password—every time you boot your system.

We understand. To rid yourself of having to enter any kind of password to access your operating system, which allows Windows 8 to boot straight into the Start Screen without any input from you beyond hitting the power button on your system, you'll want to adjust a setting within Windows 8's User Accounts window.

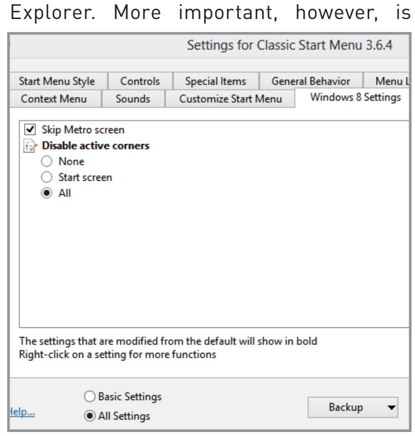
To jump to the exact place we're going to highlight, head over to your Windows 8 Start Screen and type in **netplwiz**. Click the icon to pull up your User Accounts window and deselect the checked box that says, "Users must enter a user name and password to use this computer."

BYPASS THE START SCREEN

There's nothing wrong with Windows 8's Start Screen, per se—it's a lovely search tool as far as we're concerned. It just fails to live up to expectations in a typical desktop or laptop PC environment as compared to the trusty ol' Start Menu of yesteryear.

So, let's fix that. Go download and install a free app called Classic Shell (www.classicshell.net). Once you've installed it, you'll notice that your computer will have bypassed the traditional Start Screen the next time you boot into Windows 8. As an added bonus, a brand-new start button—complete with traditional start menu functionality—will appear in the lower-left corner of Windows 8's Desktop Mode.

You can right-click this new start button for a quick shortcut to Windows Explorer. More important, however, is



You can use Classic Shell to completely disable Windows 8's "Active Corners" feature, if you want absolutely nothing appearing when you move your mouse around your screen.

Classic Shell's Settings menu, which you can use to customize all sorts of items related to the new start menu that you've created for yourself. Get into the nitty-gritty of the available options if you want. Otherwise, you can simply select a style—Windows Classic, Windows XP, or Windows Vista/Windows 7—that you'd like your start menu to emulate.

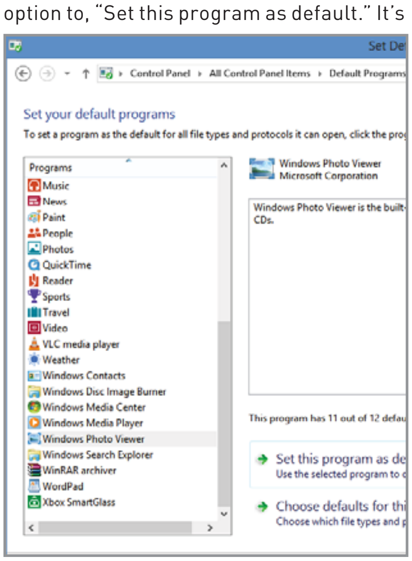
And if, for whatever reason, you want to enable Windows 8's Start Screen (traitor), you can turn that back on within Classic Shell's "Windows 8 Settings" tab. Don't say we didn't warn you.

DITCH THE DEFAULTS

There's absolutely nothing good to be had from Windows 8's default apps for multimedia—here's looking at you, Videos, Music, and Photos. We dislike you immensely, mainly because you're really just a front for Microsoft to sell content versus actually provide tangible playback or browsing features that aren't more annoying than they are useful.

Yes, we went there.

Go grab yourself an awesome multimedia app like Media Player Classic or VLC and install it. Once you've done so, head on over to your Windows 8 Start Screen, type **default programs**, and click the corresponding icon. Click the option named "Set your default programs." In the window that appears, scroll down to find your multimedia player of choice—either Media Player Classic, VLC, or good ol' Windows Media Player—and select it. From there, click the option to, "Set this program as default." It's as easy as that.



FYI: If you set another web browser as the default for your surfing, you'll lose the ability to pull up Windows 8's Internet Explorer app on your Start Screen—it'll instead go to the Desktop Mode version.

While you're there, be sure to hit up Windows Photo Viewer and set that app to open all of your pictures by default, as well. You'll be glad you did.

LEARN YOUR GESTURES

We hope you were paying attention the first time you booted your system into Windows 8, because Microsoft's cursory overview of gestures—if you can really call it that—is the best you're going to get out of the box. But it's not really fair for you (and your touchscreen device or monitor) to jump into the wide world of Windows 8 without a life preserver for your fingers.

If you want to get a better sense of the gestures Windows 8 supports, Microsoft provides a fairly thorough list within the Developer Center for its Windows Store apps. Hit up the "Gestures, manipulations, and interactions" page (http://bit.ly/VYqXEb) to see exactly what your Windows 8 system will recognize.

If you'd rather print out a detailed list of the differences between a desktop tap, finger-pinch, and greasy-hand-smear, then HP has you covered. Head over to its generic "Windows 8 Touch Gestures and Keystrokes" page (http://bit.ly/WTlUQM) to see which gestures map to which actions within the Windows 8 environment. And to look at things a different way, David Pogue of *The New York Times* breaks down the Windows 8 basics by action (http://nyti.ms/VJvRpf)—telling you which finger-driven actions, mouse manipulations, or keyboard hotkeys accomplish which tasks, like opening up the Charms panel or splitting the Start Screen into two apps.

STORE YOUR SPACE

One of Windows 8's fancy new features is called Storage Spaces, a kind-of software RAID you can use to create heaping pools of storage out of, well, any kind of storage you have attached to your system, be it a physical hard drive, an external eSATA drive, a flash drive, etc. What you lose in speed over a hardware RAID, you gain in convenience—to an extent—through your ability to add and remove storage from the "pool" at will.

Setting up a Storage Space couldn't be any easier. Hit up your Windows 8 Start Screen, type in **storage spaces**, and then click the Settings button on the right-hand toolbar to bring up the official Storage Spaces icon. Click it. Select the option to "Create a new pool and storage space." Windows 8 will ask you which of your attached disks you'd like to use to populate your pool—note that you can change this configuration at any point afterward, if you desire, but any disks you select that have data on them will be wiped. Click the Create Pool button and get ready to set some options.

On the next screen, Windows 8 will ask you for a name and drive letter for your new Storage Space. Easy enough. It'll also ask you which resiliency type you want to employ. You get one of three options on this one: two-way mirroring (requires at least two disks), three-way mirroring (requires five disks), and "parity" mode (requires three disks; more usable space, but worse performance).

You'll also note that you can set a maximum storage size for your pool that greatly exceeds the available storage of the disks you've connected up to it. That's intentional, although it's likely more useful in a multi-user environment than your single-user desktop or laptop. The point is that you can create multiple spaces within an overall pool of storage under the assumption that each space won't be used to its full capacity. And as your storage needs grow, you can simply add more drives.

Once you've finished your configuration, hit the Create Storage Space button to do just that—your new storage area will appear within File Explorer as if it was a conventional volume.

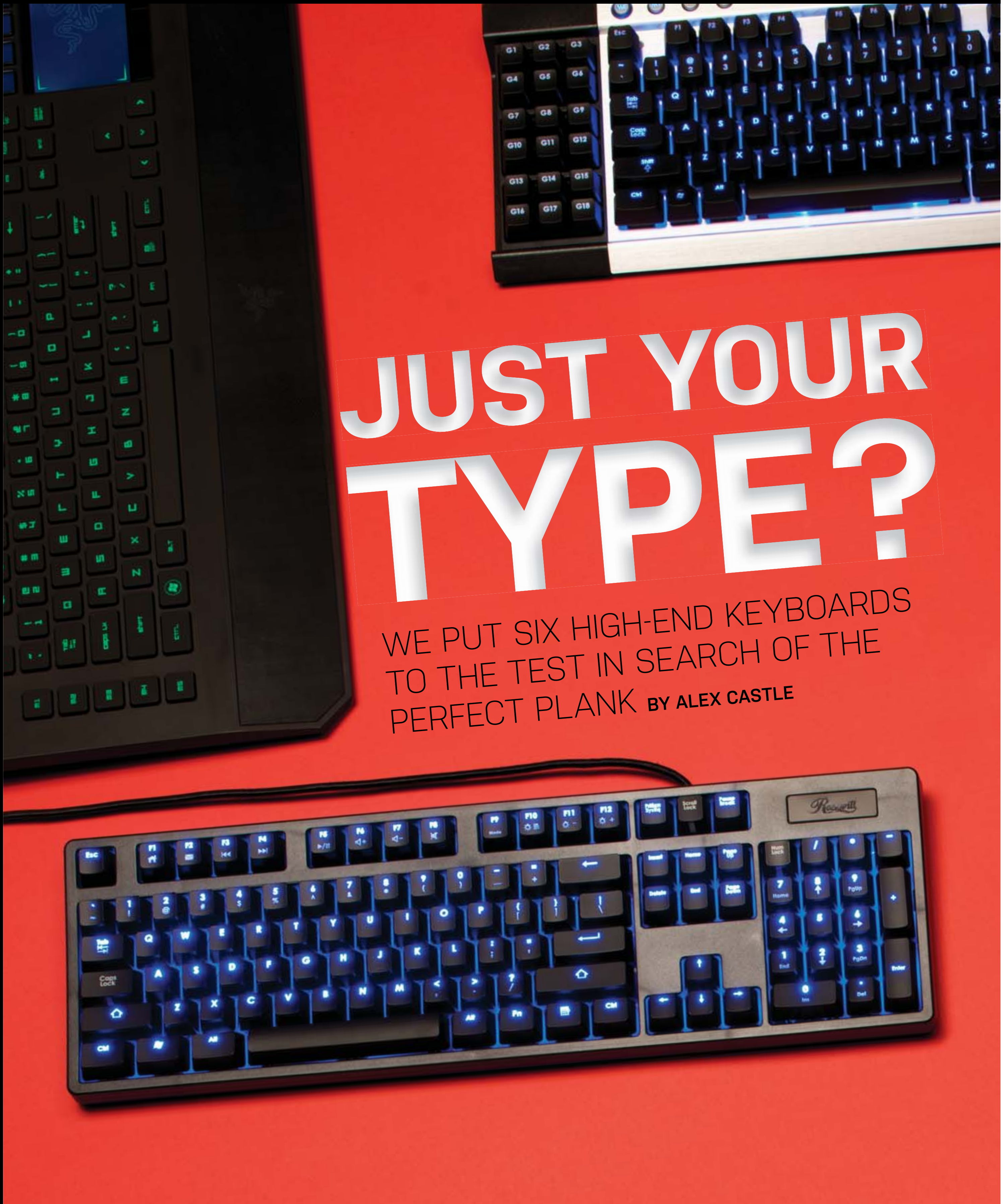
ORGANIZE YOUR TILES

One of the banes of Windows 8 is that installing any new application—that's "desktop application," not "Windows 8 app,"—is likely going to dump a whole ton of tiles onto your Start Screen. The second you touch a web app like Ninite, it's going to look like a tile explosion went off within your Windows 8 installation.

To quickly remove tiles from your Windows 8 Start Screen, simply hold down Control and start clicking them. Once you've highlighted the icons you want to remove, just select the "Unpin from start" option that appears on the bar at the bottom of your Start Screen. Simple, right?

Windows 8 also lets you organize your tiles under named groups, if you want to be sure that you're lumping all of your "Games" in the right place, for example. On your Start Screen, move your mouse cursor to the very bottom-right of the screen and click the square that looks like it has a minus sign within it. This will zoom out your tiles and allow you to better see the various icon groups that you're currently using. Right-click any of these groups and select the Name Group option to do just that.

Now if only Windows 8 were smart enough to help you automatically sort new icons *into* your preset groups....



JUST YOUR TYPE?

WE PUT SIX HIGH-END KEYBOARDS TO THE TEST IN SEARCH OF THE PERFECT PLANK **BY ALEX CASTLE**



If you're a gamer, you can probably identify a few points in time when you realized something important about your control setup that made you better at the game. When you discovered that putting your left hand on WASD gives you more options than putting it on the arrow keys, for instance, or when you realized that your crappy optical mouse was actually holding you back in shooters. These kinds of peripheral epiphanies don't happen every day, but it might be just about time for you to have a new one. It might be time for you to realize that your keyboard is holding you back.

We're giving you some credit here—we're not talking about making the upgrade from a $6 keyboard you got at the grocery store. No, we're talking about making the upgrade from a gaming keyboard to an amazing gaming keyboard. Going from entry level or midrange to top-of-the-line.

We looked around and picked out six of the highest-end keyboards released in the last year, starting at just under $100. To compare them, we put them through our usual battery of real-world testing, including gaming and typing, and compared their features and overall feel. Because these keyboards come attached to some pretty heavy price tags, we made sure to give them extra scrutiny. We know that minor inconveniences that might fly on a cheap keyboard become a lot more galling when you've paid $150 for the privilege of suffering them, and our verdicts reflect this.

Ready to make the upgrade to serious typing hardware? Then let's go!

RAZER DEATH-STALKER ULTIMATE

Fun to look at, less fun to use

THE RAZER DEATHSTALKER is really a thing to behold. The gaming keyboard is thin, sleek, and nicely designed with tri-color glowing keys, but nothing draws your attention like the "Switchblade" user interface, borrowed from the Razer Blade gaming laptop.

The Switchblade UI consists of a responsive multitouch 4.3-inch LCD touchscreen and 10 context-sensitive dynamic keys. The screen can act as a trackpad, or can play host to a number of applications including a web browser, Twitter client, YouTube viewer, and plenty of others, such as game-specific apps for a handful of popular titles. Additionally, the keyboard has plenty of on-the-fly macro keys, and the software suite that manages it is polished and very powerful. In other words, the Razer Deathstalker is clearly the most sophisticated gaming keyboard around. The question is, do the Deathstalker's technical flourishes justify its massive $250 price tag.

At that kind of price, we expect every element of a keyboard to be top-notch; unfortunately, that's not the case with the Razer Deathstalker. The problem is the keyboard itself, which uses widely spaced chiclet-style keys, familiar to anyone who's used a MacBook or most Ultrabooks. They look nice, but it's not clear why a large, high-end gaming keyboard would opt to use them over mechanical switches or even rubber-dome membrane keys. The chiclet keys simply don't feel very good to use—they float around inside their tracks and have miniscule travel when pressed. They're not awful, but we'd expect a lot better from a $250 keyboard.

VERDICT 7

Razer Deathstalker Ultimate

$250, www.razerzone.com



Instead of a number pad, the Deathstalker Ultimate features a touchscreen, along with 10 contextual keys.

CYBORG S.T.R.I.K.E. 7

Plenty of novel features, but look at that price

PROBABLY THE most interesting thing about the S.T.R.I.K.E. 7 is that it's modular and customizable. When you first take it out of the box, the keyboard is in seven pieces, which can be screwed together in a number of different configurations. One of the pieces is a large touchscreen, which can be affixed to either the left or right side of the keyboard, as can an extra bank of macro keys and the adjustable "active palm rest," which features a thumb wheel and button. The two halves of the keyboard can be used separately, though both must be connected to the touchscreen, and the kit comes with a set of 16 replacement key caps, so you can make sure your S.T.R.I.K.E. 7 doesn't look like anyone else's.

On the other hand, you probably won't meet anyone else with a S.T.R.I.K.E. 7, unless you regularly attend LAN parties down at the yacht club. At $300, this is the most expensive keyboard we can remember reviewing, and some of the features just don't rise to the level of expectations set by the price. The touchscreen, for instance, is resistive and not nearly as responsive as the screen on the Razer Deathstalker Ultimate. And like the Deathstalker, the S.T.R.I.K.E. opts for non-mechanical keys. Though the dome-style membrane keys are better than the Deathstalker's chiclet keys, we firmly believe that a keyboard that costs three times as much as most of its competition ought to have the best keys available.

VERDICT 7

Cyborg S.T.R.I.K.E. 7

$300, www.cyborggaming.com



The S.T.R.I.K.E. 7 is modular, and can be assembled in several different configurations.

LOGITECH G710+

Logitech brings it back to basics

LOGITECH HAS finally decided that the recent trend toward mechanical gaming keyboards isn't a passing fad, and has thrown its own hat into the ring with the G710+. At $150, the G710+ is one of the company's most expensive boards, but it forgoes the LCD screens and raft of macro buttons usually found on Logitech's highest-end products. Instead, the G710+ is a relatively straightforward keyboard built around a sturdy base of mechanical keys.

The G710+ uses MX Cherry Brown switches, which are a sort of compromise between the hyper-sensitive Reds and the tactile (and loud) Blues. They're a nice middle-ground switch, excellent for both gaming and typing, though not completely ideal for either. Logitech has augmented the Cherry Browns with noise-dampening rings inside each key, for a quieter gaming session. The keys are mounted into a heavy board, with a clean black-and-gray aesthetic with orange accents. When connected via USB, the G710+'s laser-etched keycaps glow white—you can't change the color, but the brightness is adjustable. In a nice, novel feature, the brightness of the WASD and arrow keys can be adjusted independently, to make them stand out more.

Beyond the mechanical keys, the G710+ doesn't have a lot of flashy features—just a set of macro keys (programmable on-the-fly), some media controls, and a standard-issue software suite with pre-made macro profiles for most modern games. It comes with a removable wrist rest, and includes a single USB pass-through. In all, it's a nice, well-constructed keyboard, though its feature set is just a tiny bit smaller than some similarly priced mechanical boards from other brands.

VERDICT 9

Logitech G710+

$150, www.logitech.com



The backlight for the Logitech G710+'s arrow and WASD keys is separate from the rest of the board, so you can make them glow brighter than their surroundings.

THE ART OF CHERRYPICKING

If you're the pattern-recognizing sort, you may notice that every mechanical keyboard in this roundup uses Cherry MX switches for their key mechanisms. That's because virtually all mechanical gaming keyboards today use some variety of Cherry MX switch, such as Brown or Blue. The names indicate both the actual color of the switch (pry a keycap up and you'll be able to tell by sight which switch is underneath), and the switch's mechanical characteristics, in terms of tactility and resistance.

A switch that is highly tactile has a noticeable "bump" that you overcome as you press it down, and tends to make a click noise as it passes that bump. A switch with high resistance requires more force to depress. Here are the four most common varieties of Cherry MX switch:

Red: A non-tactile switch with low resistance. The pressing action is smooth, with no bump, and because of its low resistance it is very responsive. Good for action gamers.

Black: A non-tactile switch, like the Red, with higher resistance.

Blue: A highly tactile switch, with a dramatic (and loud) click. Considered the best switch for typing, but they can be slightly harder to double-tap quickly for gaming.

Brown: A middle-ground switch, with a light tactile click and medium resistance. Functions well for both typing and gaming.



Image courtesy of Corsair.

CORSAIR VENGEANCE K90

All the macro keys money can buy

THE CORSAIR Vengeance K90 launched early last year alongside the Vengeance K60. It is, at heart, an expanded version of that board, fitted with a vast bank of customizable macro keys at the far left, and a detachable rubberized wrist rest. The extra functionality is mostly aimed at MMO players, who may have need for the truly staggering number of macro keys—18 keys, arranged into three banks of six, with three profile buttons for a total of 54 programmable actions. We're a bit skeptical about the utility of so many macro buttons, as it becomes difficult to remember which key does what, and to hit them without looking, as the button count increases. Still, you should be able to imagine whether you'd be able to put the buttons to good use or not.

Beyond those extra keys, the K90 features the strong points of the K60, including a rugged all-aluminum body and responsive Cherry MX Red switches. The fantastic-looking low-profile aluminum design is even snazzier in the K90, thanks to blue backlighting that shines through the laser-etched keycaps. One of the strangest and worst features of the K90 is that it uses membrane-style switches for a small subset of the keys on the board (the 18 macro keys, the function keys, as well as the block above the arrow keys), which feel noticeably worse than the mechanical keys that make up the rest of the board. Especially for keys that are meant to be used in the heat of the moment, the transition to non-mechanical keys is very jarring.

VERDICT 8

Corsair Vengeance K90
$130, www.corsair.com



With the K90, Corsair goes deep on macro keys. Unfortunately, only the main QWERTY keyboard and arrow keys are mechanical.

ROSEWILL RK-9100 MECHANICAL GAMING KEYBOARD

A solid board, low on features

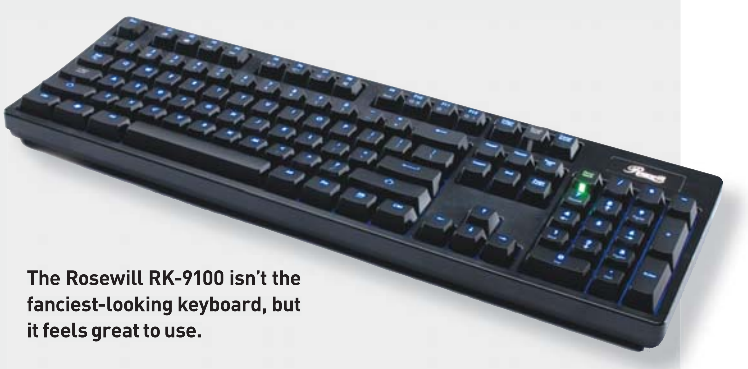
SOMETIMES IT'S nice when a company comes along and boils down a product category to just the features that are important. With the RK-9100, Rosewill does just that, offering a solid mechanical gaming keyboard with few flourishes.

The RK-9100 is a compact design with no wrist rest and a minimal lip around the outside of the board. It's heavy, and feels quite sturdy. It uses mechanical keys—once again, Cherry MX switches, though with the RK-9100 you have a choice of the typing-friendly Blue switches, or the in-between Browns. We tend to prefer the Browns as a nice compromise between gaming and typing, which makes it a bit frustrating that the Brown-switch version of the RK-9100 retails for $130, $20 more than the Blue version.

The keyboard has a nice blue backlight, except for the scroll-, num-, and caps-lock keys, which glow green while active. It's a good idea, but for some reason the green light is incredibly bright, and angled to shine right into your eyes while active. It's distracting, and unfortunately can't be turned off—we wouldn't be surprised if most RK-9100 owners end up fixing the problem with electrical tape. That's the only significant problem we noticed while using Rosewill's keyboard, but we couldn't shake the feeling that $130 is a bit too much to ask for this board. The Logitech G710+ features the same MX Brown switches, and with street a price that's currently only about $10 more than RK-9100, includes significantly more features that set it apart as a gaming keyboard.

VERDICT 7

Rosewill RK-9100 Mechanical Gaming Keyboard
$130, www.rosewill.com



The Rosewill RK-9100 isn't the fanciest-looking keyboard, but it feels great to use.

ROCCAT ISKU

Membrane plank makes strong impression

IF YOU'RE not ready to make the jump to a mechanical keyboard, and aren't interested in touchscreens or scalp massagers or whatever other luxury features are going into the $200-plus planks, your money will go a lot farther. Specifically, it'll go all the way to the Isku, a handsome and feature-rich keyboard from German newcomer Roccat.

The Isku is wide and flat, with an oversized wrist rest and a wide bezel all around the board, taking up plenty of desk real estate. It's got a grippy textured-plastic frame and recessed contoured keys that make the whole thing seem flatter and lower to the desk than normal. The dome keys are good (as far as they go) with a fairly crisp and responsive activation.

Where the Isku really shines is in its expansive set of features. It has eight macro buttons (including three "thumbster" keys under the spacebar), with on-the-fly recording, and profile switching. It gets further mileage out of the bindable keys and macros with an "EasyShift" button where the caps-lock key would normally be, which temporarily switches the functions of all right-hand-accessible keys while held down. There's a lot to customize, and the included software suite is intuitive and up to the task.

Also, the Isku is part of the "Roccat Talk" ecosystem, which allows button presses on the keyboard to affect the behavior of a Roccat gaming mouse, and vice versa. At this price, we'd strongly recommend buying a mechanical board, but if you can't or don't want to, the Isku is an excellent choice.

VERDICT 9

Roccat Isku

$90, www.roccat.org



The Isku is thin but takes up a lot of room, thanks to its broad wrist rest and bezel.

A KEYBOARD FOR CLEAN FREAKS

One of the keyboards we received while preparing this roundup was the Logitech Washable Keyboard K310. Somehow it didn't seem quite fair to pit the $40 K310 against the likes of the Razer Deathstalker in a straight head-to-head, but we couldn't resist the chance to see if this washable keyboard really works.



The K310 has a standard full-size layout with flat, thick plastic keys. Despite the very plastic-y construction and non-standard keys, the keyboard actually feels pretty decent to use.



We don't actually have a standard testing procedure worked out for washable keyboards, so we improvised. We took a quick trip to the corner store for a bag of Cheetohs—bane of all keyboards. We then used a mortar and pestle to mash them into a fine, delicious powder, and applied it liberally to the keyboard (and surrounding table).



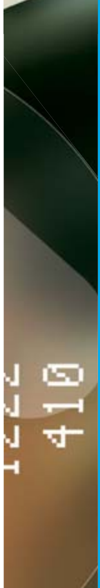
We were originally going to stick the K310 in the dishwasher, but a label on its back specifically warns against doing so. Instead, we gave it a thorough hand-washing in the sink.



What's the verdict? The keyboard looks like new, and works just fine. Not bad!

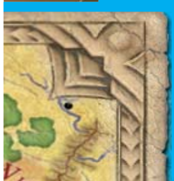

OUBLE FINE
ADVENTURE
SAMSUNG
Progress Screenshot - Environment and Character Style Development
FREE PALATINATE
OF DYRWOOD
RUINS OF
EIR GLANFATH
PEARLWOOD GULF
THE PEARL COAST
THE WORLD



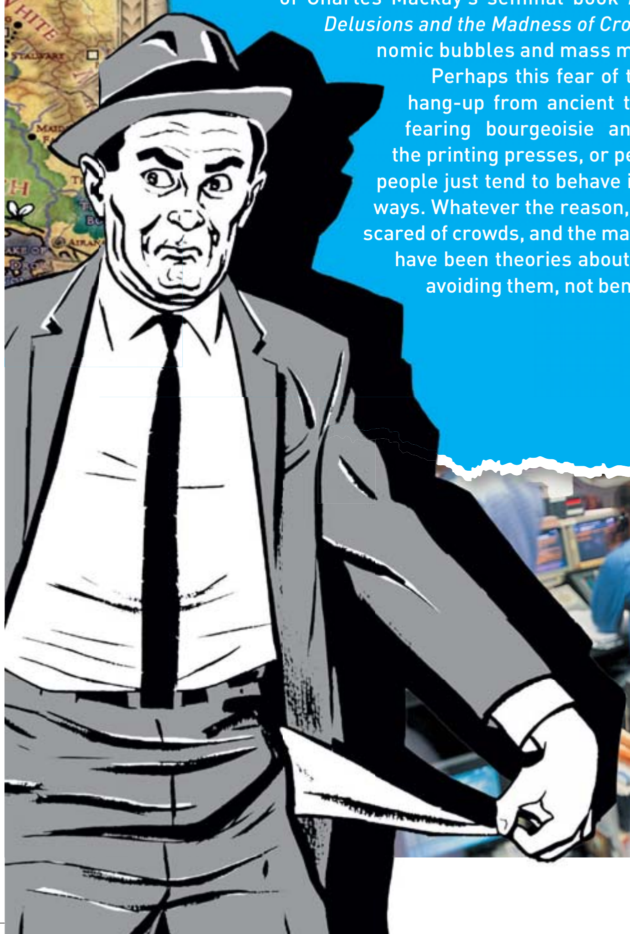


The Madness of Crowdfunding

KICKSTARTER LOOKS SET TO REINVENT THE TRADITIONAL DEVELOPER-PUBLISHER MODEL, BUT IS THIS JUST THE START? **BY DAN GRILIOPOULOS**



THINK OF A CROWD. Think of a mob. Think of a mass. The collective nouns for "people" mostly carry a negative connotation because, in the English language at least, such large groups are regarded apprehensively. If a third party talks about a crowd's "mind," then that collective intelligence is automatically levelled down, sometimes to stupidity and more often to madness (except in obscure Sci-Fi or fantasy). Think of Charles Mackay's seminal book *Extraordinary Popular Delusions and the Madness of Crowds*, focusing on economic bubbles and mass movements.



Perhaps this fear of the crowd is a literary hang-up from ancient times, when the mob-fearing bourgeoisie and aristocracy owned the printing presses, or perhaps large groups of people just tend to behave in scary and antisocial ways. Whatever the reason, we are fundamentally scared of crowds, and the main products of this fear have been theories about coping with them and avoiding them, not benefiting from them.

Yet in recent years, the crowd has been getting more and more attention. It seems that earlier fears of crowds simply played out of our limited understanding of their dynamics. Now, we've found ways of utilizing the crowd's processing power; several technologies, such as Amazon's Mechanical Turk, now allow companies to "crowd-source" ideas—outsourcing difficult or lengthy tasks to the crowd, which can complete them more efficiently and cheaply than an in-house solution.

And, more importantly for us, this trend has spawned crowdfunding—the use of crowds to pay for and approve projects—often creative ones. The vast majority of crowdfunding platforms are websites that allow anyone to establish a project, set up a pitch, and establish a funding goal, so that the "crowd" can donate money to their idea, either philanthropically or in return for certain associated rewards. More recently, crowdfunding is integrating social media technology so players can track what their friends are funding and allow projects to go truly viral. And, in doing so, it might have changed the future of game and technology development forever.



THE CROWD RISES

Crowdfunding began in a curious place. There are three notable starting points. First, there was the 1997 US Marillion tour, which was funded by fans, who raised $60,000 without the involvement of the band itself.

Second, there was the Nine Inch Nails album *Ghosts I-IV*, which was given away for free, with superfan-targeted versions carefully tiered by price and exclusivity.

Finally, there was ArtistShare, the first dedicated crowdfunding site, which was founded in 2000 to help artists pay for album creation. The first completed project on ArtistShare won a Grammy award, and its artists have received 13 nominations since.

Like these examples, the vast majority of crowdfunded projects are in entertainment. Professor Yan Chen of the University of Michigan School of Information thinks there are two reasons for this: "First, traditional funding sources for arts and humanities have been cut more drastically than other areas, such as science and engineering, in recent years. Second, the deliverables [final products] are easily evaluated by the laypeople, and thus more suitable for crowdfunding."

Andy Payne, serial games entrepreneur, says, "It's come out of bank lending and investment grinding to a halt and creative people getting tired of talking to people who don't know what they are talking about."

There are now crowdfunding platforms for pretty much every project under the sun. ArtistShare helps musicians find sponsors to let them complete pieces; Fundageek pays for technical innovation and scientific research; Fundable pays for startup businesses; GoFundMe helps people who are recovering from health problems; Indiegogo does indie games; Loudsauce crowdfunds social awareness advertising campaigns; Mobcaster creates TV pilots; Weeve is a nonprofit crowdfunding site for nonprofit organizations; and Myfreeimplants.com focuses on funding for breast augmentations. We kid you not.

GETTING KICKSTARTED

The major funding platform at the moment is Kickstarter (www.kickstarter.com). Since it launched in April 2009, more than 2.5 million people have used it to pledge more than $389 million in funding for more than 74,000 creative projects. Of that, $333 million has gone to projects that met their targets and were ultimately successful. The site has a success rate of 44 percent, skewed down by a few projects that never get any money. Most projects have goals in the $1,000–$10,000 bracket, but 14 projects have broken a million dollars (we've listed three in this article's "Kick-Study" sidebars).

Why is it so popular? Well, part of it is the snowball effect that made World of Warcraft and Facebook the world's leading social game and network, respectively. Another factor is that Kickstarter is an all-or-nothing, no-equity funding site. This means that when you set your target for funding—be it $10 or $10,000,000—you have to raise at least that much, or you get nothing. The "no equity" clause means that those who pledge money via Kickstarter don't get any share of the company (unlike other platforms like Gambitious).

If you help fund a project through Kickstarter, you're not guaranteed any return; if the project fails, you get nothing. What you get if it succeeds is specified by the project creator. He or she can do this by setting up funding tiers of say $1, $5, $10, and so on. Once a donor passes a tier, he or she gets the benefits associated with that tier. What Kickstarter doesn't allow is for users to get either a profit or a share of the project they're funding.

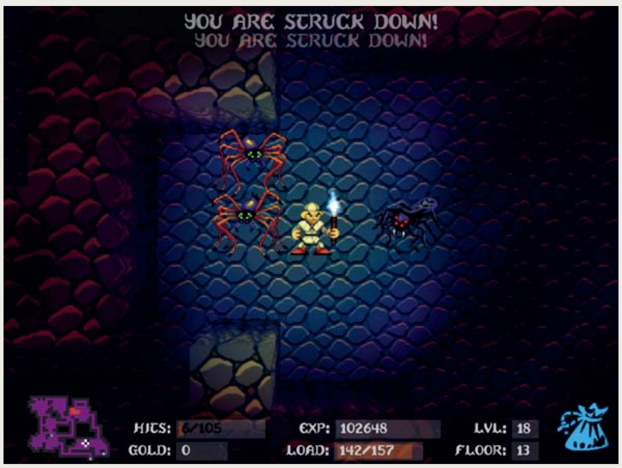
Over the last two years, participation in funding projects has surged to such a degree that we're predicting a hollowing out of major companies as a generation of entrepreneurs decide to go it alone. Andrew Schrage of Money Crashers tells us, "Crowdfunding transactions were roughly $1.5 billion in 2011, with some estimates doubling that figure for 2012. Some analysts say it could reach $500 billion in 2013."

The biggest success stories of crowdfunding, mainly through Kickstarter, are games and technology. For games, the watershed project was Tim Schafer's Double Fine Adventure.

FINE ART

Schafer was behind the legendary adventure games Monkey Island and Grim Fandango, and Double Fine is his studio. It used to work on projects for major publishers, typically producing AAA games that were too quirky, clever, or hardcore to sell particularly well, and it was struggling badly. Each new problem made it spiral closer to bankruptcy and the team seemed doomed.

When its over-hyped Brütal Legend, a heavy-metal action game starring Jack Black, was canned by Activision then failed to





For all the successful Sword of Fargoal 2s (left) around, there are more unsuccessful projects, such as Risque (right)—though Risque reckons it's learned from its mistakes and is back for a second go at funding.



Spaghetti westerns + SNES RPGs = Boot Hill Heroes, a game that probably wouldn't have been made without Kickstarter.

sell for EA, the sequel was cancelled. Schafer sent his team away and told them to come up with lots of small games that could be sold as download-only. These all got publisher support, kept the company going and garnered critical success (and popular adulation). But although they satisfied the team's creative itch, they didn't refill the coffers.

Schafer still wanted to make a new adventure game, but no one would buy it. As his long-time collaborator Ron Gilbert (creator of Maniac Mansion) says, "I can tell you that if you even utter the words 'adventure game' in a meeting with a publisher, you can just pack up your spiffy concept art and leave."

So Schafer bypassed the publishers and set up a Kickstarter in March 2012. His pitch to the public was straightforward: You trust me and my company, you know we'll make something great, you can't get new, good adventure games any other way, and we only want $300,000. Notably, he mentioned very little about the game itself.

A $300,000 budget is extremely small for AAA game development (the downloadable games had been working with a budget of $2 million each), but public interest was such that Schafer's project blasted past its modest goal, securing $400,000 in the first nine hours alone. By the time payments had closed a month later, the game had raised nearly $3.5 million from 87,000 backers.

This is still not a huge amount in terms of game development, but it signalled to many other developers that Kickstarter was an alternative funding spot for their games; it completed the breakdown of the publisher-distributor system that had been the bane of developers' lives since the end of Shareware in the 1980s. With Steam Greenlight and Kickstarter, developers can now fund a game by themselves, promoting it at the same time, and then distribute it (without the fixed cost of manufacturing stock), retaining the majority of the profits for themselves.

THE BALL AND CHAIN

"The advent of digital publishing, Steam, the App Store, Google Play, and digital downloadable content everywhere is eroding the near monopoly which was traditionally held by the major publishers," says Todd Tribell, co-founder of Digital Capital, a highly specialized investment firm for cutting-edge technology. "As a result of digital downloads, the risk of maintaining $10-20 million worth of inventory that one might not sell is now eliminated. Combined, the elimination of the 'ball and chain' as I call them [inventory and console licenses] is, in my opinion, the game-changer here."

Since then, we've seen many indie studios redirecting their efforts toward Kickstarter and many better-known developers leaving studios to go it alone. As Tribell says, "We are in a dynamic time in this industry and the shift has already occurred—past tense. This I attribute, from a practical perspective, to Harrington and Newell at Valve, and to Steve Jobs, who I believe have collectively had the biggest impact on this transformation in industry politics through the advent of download technology. The reality as I see it: I am in on the ground floor of something that is a virtually

KICKSTUDY 1: OUYA

There's a good reason why many projects don't get funding from investors—they're insane. Ouya could easily fall into this category.

Game consoles made by companies other than huge hardware behemoths have typically failed—see Gizmondo, digiBlast, and the N-Gage. They either haven't sold any units, haven't had any games to play, or have turned out to be tax dodges/money-laundering scams. Investors have been burned so often in this field that they'd have to be arrogant or crazy to fund them.

But Ouya is different. Yes, it's made by a small company with no history in this field, but it's being built with Android technology and supports the game-streaming client OnLive, so it already has a huge library of AAA titles. It's got designers on board who have made games consoles before. It's super-cheap, at only $99. It's designed around downloadable games. It's even got a touchscreen on its control pad!

Ouya made its Kickstarter goal of nearly a million dollars in less than eight hours. By the time it closed, it had made $8.5 million. Founder Palmer Luckey says, "Kickstarter really helped provide a high-visibility, easy-to-use platform for launching our developer kits. Not just gamers, but a lot of technology enthusiasts as well, browse the Kickstarter site looking for cool projects, and we got a lot of backers that way." With success came even more support—Square Enix has pledged to put Final Fantasy 3 on the console, former Infinity Ward developers announced exclusive games for it, and many other media firms have announced that they would be supporting it.

We don't expect the Ouya to ever be a mass-market console—it's too complicated and too ugly to have broad appeal, and it's likely that the next generation of TVs will have similar (cheaper) hardware built in to support streamed and Android games. Most games industry people believe that the days of consoles are drawing to a close anyway, but Ouya could be an upstanding member of that last generation.



brand-new industry, and I truly believe that the dynamics of the old titans in the industry are going to have to dramatically change or soon they will be gone—the same I expect to see with the console and the DVD."

Famous developers like Brian Fargo of Wasteland fame, Tim Cain of Fallout (who left his publisher-driven MMO Wildstar), and Chris Avellone of Planescape: Torment have all moved their projects to Kickstarter. "Look at now versus three years ago," says Fargo. "How many independent studios are carving out businesses for themselves? And we all have different niches. One guy might do a fly-fishing game, or a train simulator. He's got his audience and he sells to them and he's got a great business for himself. We're already seeing a lot of really talented people leaving the publishers to do what we're doing."

Obsidian's Project Eternity hit nearly $4,000,000, again with little initial detail. Fargo's Wasteland 2 hit nearly $3,000,000. Planetary Annihilation (a modern-day Total Annihilation) reached

KICKSTUDY 2: OCULUS RIFT

Virtual reality has been attempted many times, but remains one of the unfulfilled dreams of 1980s science fiction. *Lawnmower Man, TRON*, Robin Williams's *Toys*—VR was the future, but every single device that's been developed has failed. The resolution hasn't been high enough, people using it have become nauseous, and the tech has been bulky and unusable. The difference with the Oculus Rift is that it satisfies the current generation of nerds' concept of what VR should be.

Oculus CEO Brendan Iribe admits that VR hasn't always lived up to nerd dreams. "Every headset that has come out, every VR has been pretty disappointing. For the first time, you've got this headset and you're suddenly in the game, you're looking around, it's tracking perfectly to your head, so your eyes are the camera. You can look and move around in the game very seamlessly."

John Carmack, creator of Doom and Quake, is an admirer, calling it "a gaming experience with a level of immersion genuinely unlike anything else we have ever encountered." It does this through a combination of high field-of-view, low latency, and special tech to counter motion sickness.

Despite these positives, we're not entirely convinced by the Oculus. The kit has to be even less bulky, and the 640x800 resolution per eye seems insufficient. And we're not convinced that 3D is necessary at all, or that the motion sickness problem has been fixed. But enough people have now paid for it that it's a certainty it'll enter mass production. It, like the other two KickStudies in this story, reached 10 times its goal, raising $2,500,000 from nearly 10,000 backers. It's also being heavily backed by FPS game developers, including Carmack, Valve's Gabe Newell, and Epic's Cliff Bleszinksi. The stunningly beautiful mech game Hawken is also going to support it out of the box.





A persistent, infinite Dungeon Master-esque world of adventure, Malevolence sure looks fun.

$2,300,000. Shadowrun, an old RPG series, got $1,900,000 for a 2D RPG for tablets and PC. Homestuck Adventure, an adventure game based on a popular webcomic, got $2,400,000. A new Broken Sword adventure game got funded ($700,000), despite the last iterations being disappointing. Carmageddon, a long-dead and much-beloved destruction derby game, got $625,000. Neal Stephenson, author of *Cryptonomicon* and *The Baroque Cycle*, got $500,000 to make a motion-controlled sword game. And so on.

Notably, either from the start, or in "stretch goals"—when developers say what they'll do with all their extra cash—many of these developers have pledged to support Linux and Mac games. Given that many of them are developing in the Unity engine, they're aware that, at low cost, they can make ports to other hardware platforms relatively easily. By making the developers realize that an unserved audience is there, desperate for games, Kickstarter is changing development.

The crowdfunding model also allows developers to talk to their communities about the games; for many of them, no part of the publishing or marketing model was working.

Tim Cain, now at Obsidian, says, "With Kickstarter, we are free to talk about the game during all the stages of its development. We have a better idea of what features are important, and the fans can follow the game's development and be more involved with it."

KICK IN THE TEETH

There have been high-profile failures, though. Wizardry lead designer Brenda Brathwaite and Doom creator Tom Hall pulled their Kickstarter for an "old-school RPG" because they felt that fans were funding it without actually knowing what it was. It's noticeable how many game projects have focused on nostalgia rather than innovation. All the largest and most successful projects have been adventure games and RPGs—genres that have been stagnant for a long time.

Worse, Haunts, a small horror game, received $28,000 from Kickstarter, but the developer had to put the project on hold indefinitely, as it had run out of money and programmers. Given that most punters go for the cheapest option that will give them a copy of the game, the 12,000 people who funded Haunts may feel aggrieved. They thought they were pre-ordering a game, but if it shuts down then they've lost their money.

And not all Kickstarters get funded. If you're a small indie with

no big names, you have to aim much lower in your goals. Dinofarm Games' Keith Burgun has talked about the failure of the Kickstarter for his tactical dungeon-crawler Auro, emphasizing the need for good communications. Successful pitches on Kickstarter are supported by a reasonable video, regular blog updates, sensible goals, and attractive payment tiers. Burgun recommends playing it straight and waiting until you've got something to show. And if you don't get the cash, don't be discouraged; work out why not and try again.

Philippe Chetrit, CEO of event crowdfunding platform Tixelated, agrees. "The key to a successful campaign is a clear and precise return on a contribution," he says. "We've seen countless campaigns fail on our platform due to people's faith in a good idea."

Carlos Solorio of clothing Kickstarter Arden Reed says competition is increasing, and that "campaigns are getting more sophisticated." He adds, "Now, companies going into a KS campaign are usually advised by several mentors and consultants—not to mention the professional videographers/screenwriters that have emerged from this industry."

Publishers are learning, too. They won't become extinct, but they will have to change. "It's pretty scary when you're a publisher and you have to fund games because that's what you need to go ship," says Obsidian's Feargus Urquhart. "But now maybe some titles can come to you secondarily, or for distribution, or something like that, where you don't have to worry about a cash outlay so much. For the $20–40 million multi-SKU console game, that's not the Kickstarter world." But for titles cheaper than that, he says, "We're getting the opportunity to go build a brand, and it's a brand that we own. And that's what changes the power a little bit."

THE NEW WAVE

One interesting new platform is European-based Gambitious, which offers the crowd equity in the project (so if the game makes a profit, the funder gets some money back) and acts like a publisher. "It's crowdfunding 2.0—new-wave publishing," explains one of the site's founders, Andy Payne, OBE. "It's not just raising lots of money; it's making sure the project goes somewhere. We're going to have a board of experts to help developers get their pitch right, make money out of it, and act as guarantors."

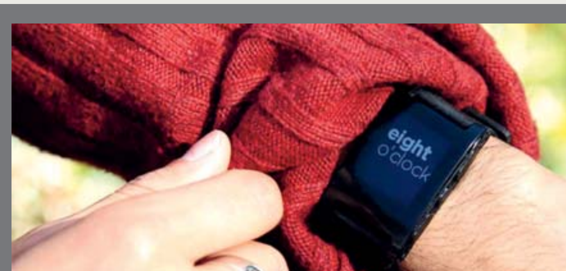
"Games are getting more expensive to make. When I started, apps were £50,000. Now it's £250,000. It will be up to millions on pocket computers in a couple of years. I think we'll see hybrid models—a bit of crowdsourcing to prove a concept is popular, then equity, then bigger equity coming in to take bigger slices. A hierarchical wisdom-of-crowds model."

It's likely that Kickstarter will adopt elements of this, especially now that the JOBS (Jumpstart Our Business Startups) Act has passed in the United States—something designed to reduce regulation on crowdfunding. As Money Crashers' Andrew Schrage tells us, analysts predict the JOBS act will help the industry grow to $500 billion in 2013. But growth in new industries tends to mean consolidation—or venture capitalists buying out everything. Payne predicts Kickstarter will be bought soon. "They're the Facebook and Twitter of crowdfunding. They have a fantastic vertically sliced community, and make lots of money from their transaction model. They will probably sell themselves to a financial institution—banking or venture capitalism."

For the future, Solorio feels the platform is "crossing the chasm" to mainstream crowdfunding. "I think you're going to start seeing entire industries shift to this funding platform. Especially those that were constrained by outsized capital needs." Of course, with the Western economies still in the doldrums, all capital is constrained, so perhaps every company will shift to Kickstarter. Maybe the crowds aren't so mad after all.



Zombie Playground. Y'know... for kids.



KICKSTUDY 3: PEBBLE

This was the first piece of technology to demonstrate the power of Kickstarter. The problem? Geeks would love to wear watches. Geeks don't wear watches. Sometimes they buy watches, but they don't wear them because they have phones that do much more stuff, and they want to have the futuristic watches they saw as kids—Dick Tracy's CB radio watch or Iain Banks's terminals that can tell you anything. A $2,000 watch that can survive total immersion to a depth of 1,000 feet is not the great leap of our science-fiction dreams.

Pebble is that science-fiction watch made real. It's a water-resistant device that can communicate with Android and iOS devices using Bluetooth 4.0 and an open SDK. In terms of hardware, the watch has a 1.26-inch, 144x168 pixel, e-paper monochrome display, plus a vibrating motor and a three-axis accelerometer. In terms of software, the watch will come with cycling and golf apps, and more can be downloaded via your phone.

None of the established high-end watch companies would ever make something this risky—something that might damage a brand if it failed. Indeed, Eric Migicovsky, the Pebble's creator, attempted to raise money from investors the traditional way, but only managed to get $375,000. "I wasn't extremely surprised," he explained. "Hardware is much harder to raise money for."

But Kickstarter showed that the demand for something as cool as this is huge. In April 2012, it launched with a target of $100,000. A month later, funding closed with over $10 million pledged by just 70,000 people. A week before closure, the company had stopped taking pre-order donations, as it was worried that it wouldn't be able to fulfil them.

iFixit presents:

AUTOPSY

THIS MONTH WE DISSECT...

Microsoft Kinect



About iFixit

iFixit is a global community of tinkerers dedicated to helping people fix things through free online repair manuals and teardowns. iFixit believes that everyone has the right to maintain and repair their own products. To learn more, visit www.ifixit.com.



BACKGROUND:

Microsoft's motion-sensing device makes it possible for users to touchlessly interface with either an Xbox 360 game console or a Windows PC. The horizontal row of motion and voice sensors sits atop a motorized, pivoting base. Here's how it looks inside.

MAJOR TECH SPECS:

• Wolfson Microelectronics WM8737G stereo ADC with microphone preamp
• Fairchild Semiconductor FDS8984 N-channel PowerTrench MOSFET
• NEC uPD720114 USB 2.0 hub controller
• Marvell AP102 SoC with camera interface controller
• Hynix H5PS5162FF 512Mb DDR2 SDRAM
• Allegro Microsystems A3906 low-voltage stepper and single/dual DC motor driver
• ST Microelectronics M29W800DB 8Mb NV flash memory
• PrimeSense PS1080-A2 SoC image-sensor processor

KEY FINDINGS:

• The base has a tiny motor that's about the size of an American quarter, with three fragile plastic gears. (The motorized base can rotate the top sensor bar to track you as you dance around the room.) Barring overheating issues with the top unit, we're guessing this motor assembly will be the Kinect's weak point.

• With a metal spudger and some pretty serious prying, we were able to remove the grill on the bottom of the sensor bar. This is not easy, as Microsoft applied adhesive quite liberally.

• Kinect's slim form factor forced Microsoft to split up the main board, stacking three boards vertically like a small apartment building.

• There's a fan at the far end of the Kinect. It's aligned to suck air in one side of the Kinect and push it out the other.

• After removing several more screws, the two cameras and the IR transmitter easily lift off the metal backing bar. These are not tiny, cell-phone cameras—they're closer to the camera you might find in a webcam, with large lenses and autofocus.

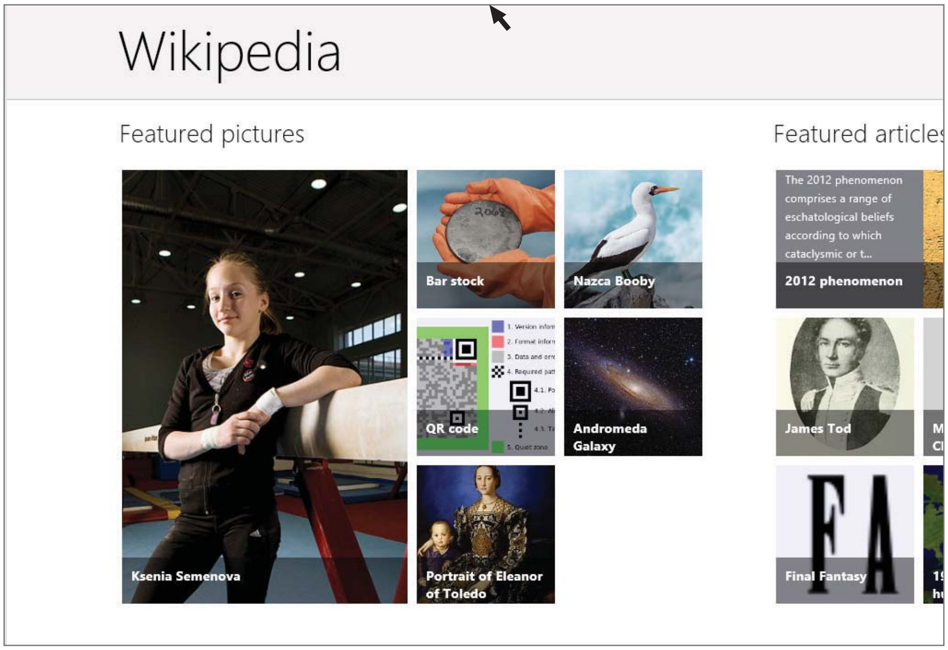
• All four microphones connect to the motherboard with a single cable connector.

• **Repairability score: 6 out of 10.** Pros: The design is very modular, and replacing individual components (like the motor) when they fail shouldn't be a problem. No soldering required to disassemble. Cons: Microsoft used four kinds of screws, including some hated security bits: T6, T10, T10 security, and Phillips #0.

HOW TO

STEP-BY-STEP GUIDES TO IMPROVING YOUR PC

WINDOWS TIP OF THE MONTH



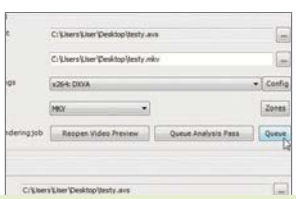
PEEL AWAY WINDOWS 8 APPS

The apps in the Windows 8 app store frequently don't come equipped with a close button—they're designed to keep running in the background. If you do want to close one for real, it's not hard. Just click the top of the app, and drag straight down. The app will first minimize, then close completely.

MAKE - USE - CREATE



58 Safeguard Your PC with Malwarebytes



60 Encode Video in HD Quality



ALEX CASTLE
CONTRIBUTING EDITOR

QUESTIONING DROPBOX

LATELY I'VE STARTED questioning why I still use Dropbox. The service is excellent, of course, but some of its competitors have been getting better and better. SugarSync, for instance, has a great-looking new client, and offers several handy features that Dropbox doesn't—most notably the ability to sync any folder on your computer, regardless of location. In addition, it now creates a virtual hard drive on your system that gives you near-instant access to any of the files in your SugarSync cloud storage, including those files not saved to your local machine.

Still, it's hard to make the change—I've already got a sprawling Dropbox folder set up just right, and since everyone uses it, it's easy to share files. Of course, with each passing day more of my data gets moved purely to the cloud, with services like Evernote and Google Drive, so in another year or two, I might not need file syncing at all.

↘ submit your How To project idea to: comments@maximumpc.com

Safeguard Your PC with Malwarebytes Anti-Malware

YOU'LL NEED THIS

MALWAREBYTES ANTI-MALWARE FREE

A fantastic, free malware scanning and removal suite, available at www.malwarebytes.org.

YOU MAY BE paying for top-of-the line antivirus software, but there's still a chance that it might miss something. That's because antivirus vendors don't share information about new threats with one another, preferring to guard the secrets of their success from potential rivals. So what one product might pick up, another might miss or think is benign.

Because of this, when faced with a potential infection, network security professionals refuse to believe the results of any single antivirus product. For a second opinion, they use scanners designed to fit their needs—and so can you. Malwarebytes Anti-Malware is a tool that's used in the security industry to provide such a second opinion.

We're going to show you how to use it to determine whether there's any cause for concern on your computer and to then perform a deep scan to root out any lurking malware that your normal product might have missed. –JON THOMPSON

1 DOWNLOAD THE TOOL First, install the free version of Malwarebytes Anti-Malware by visiting www.malwarebytes.org and clicking the Free Download link on the homepage. Doing so will take you to the Cnet download site, where you'll find the official executable for download. Click the green Download Now button and save the file to your PC.

» Unless you've opted to store it elsewhere, the Malwarebytes executable will have been saved to your Downloads folder. Double-click the file, which is called Mbytes-setup followed by a version number, to begin installation. User Account Control will appear in a pop-up window to ask if you want to continue. Click Yes and accept English as the installation language.

» The Malwarebytes installation wizard will now appear. Accept the default options by clicking Next until you get to the Install button, and check the box to accept the license agreement. If you don't want to create a desktop icon, or want to change the installation directory, you can do so in this wizard by changing the relevant options. Finally, click Install to continue.

» Once Malwarebytes is installed, leave the options to run and update the software selected. Ensure that your broadband connection is up and running, then click Finish. A progress window appears as the antivirus definitions are downloaded and installed (**image A**), along with any updates to the program itself. Once the process is complete, click OK to continue.



2 SCAN YOUR SYSTEM Performing a quick scan can warn you about any potential problems before you delve deeper. If this option isn't already visible, click the Scanner tab on the user interface. Ensure that Quick Scan is selected and click the Scan button (**image B**). Malwarebytes then begins checking user files, looking for malware signatures. It can take half an hour or more to complete this step.

» When the quick scan is complete, you may notice that Malwarebytes has picked up one or more threats, which it has highlighted in red (**image C**). Don't panic. The program will flag many different objects as suspicious, including benign cookies and installers used by legitimate sites and programs. To see details of the objects it has found, click the Show Results button.

» The detailed results screen provides additional information about the suspicious objects the program has uncovered. Many of these will be PUPS (potentially unwanted programs), and the list can also include legitimate installers and cookies. If you right-click an item you can select "Jump to location." This option opens an Explorer window in the folder containing the suspicious item.

» Right-click the results pane and choose "Check all items." This selects all the discovered threats in one go. To delete them all, simply click Remove Selected. If there are items you know are OK, deselect them by unchecking their boxes individually before pressing Remove Selected, otherwise they'll be erased along with the rest. Malwarebytes will display the result of its actions in a Notepad file (**image D**).

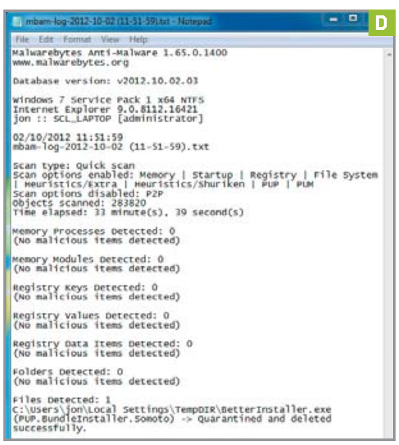
» Malwarebytes adds a menu to Windows Explorer that lets you scan individual files. This will enable you to check downloaded executables before running them. To use this feature, close Malwarebytes and open Windows Explorer. Right-click the file you want to check and select "Scan with Malwarebytes" (**image E**). The user interface will open and proceed as if you were performing a quick scan.

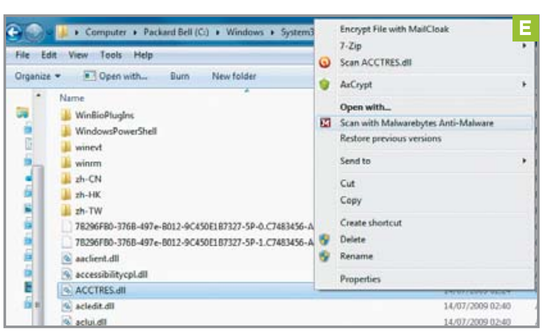
» All the files and other nasties you removed will be sent to a quarantine area (**image F**). You can safely leave them here, or delete them by selecting the Delete All button. By allowing the quarantine area to fill up rather

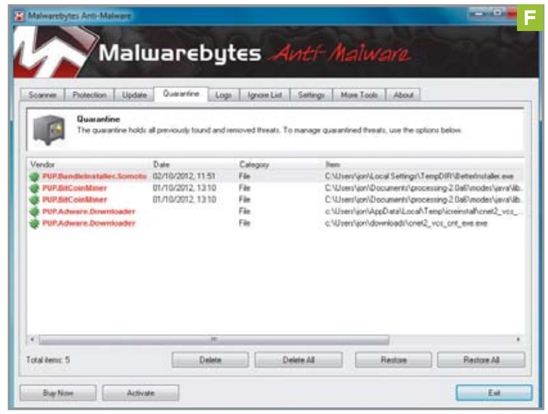
than deleting potential threats immediately, you can build up a picture of how your regular activities expose you to risks online.









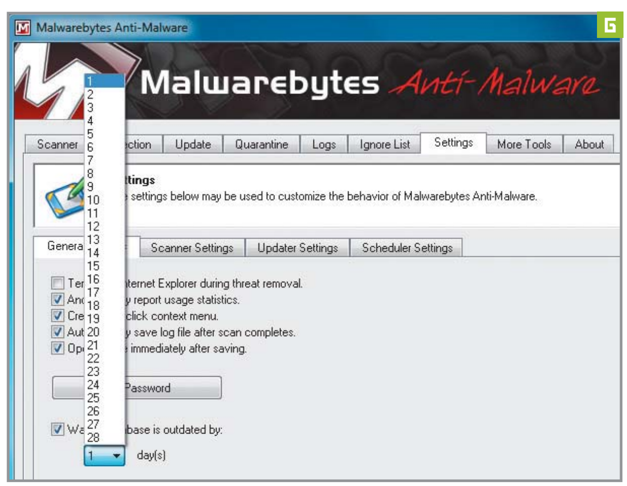


KEEP YOUR PC SECURE It's a good idea to schedule your backup to run automatically so the most recent versions of your files are saved. This will protect your data in case a piece of malware manages to get through your defenses. From Windows' Backup and Restore window (in the Control Panel), click Change Settings and set a time that's right for you. Ideally, this should be when your PC is switched on but not being used.

» The activities you've performed so far will have generated a few log files, which you can find under Malwarebytes' Logs tab. Double-clicking an entry opens it in Notepad. Each of these log files contains data about the version of Malwarebytes, along with details of your machine, the time and date of the scan, the options you selected, and a detailed list of the suspicious files detected.

» When Malwarebytes installs, it updates its database with the latest malware definitions. By default, it only notifies you when the database is seven days out of date. This is a long time in PC security. If you want the software to remind you to update the database before scanning, click Settings and set Days to 1 (**image G**). When you see the update warning, select the Update tab and click "Check for updates."

» Malwarebytes is handy to have around, and is used the world over by computer security professionals who want a second opinion on PC security. It can also give the rest of us peace of mind that our defenses are doing their job online. Though the paid-for version adds more benefits, like real-time protection, the free edition effectively reveals hidden security problems and fixes them quickly.



Encode Videos in Full HD Quality

YOU'LL NEED THIS

A PC WITH SOME MUSCLE
Encoding is a hardware-intensive process. It can take a very long time with an out-of-date computer.

ENCODING SOFTWARE
This process uses a lot of software—see Step 2 for everything you'll need to download.

DESKTOP PCS today are saturated with video. It floods in from all ports, and the scary thing is, the machines seem to take the punishment with ease. Where once we were thrilled to see a quarter-screen VGA video streamed from a CD, we now scoff and roll our eyes if YouTube can't offer 1080p, leaving our eyeballs to endure mere 720p.

With all of this video pouring into your PC, when it comes to storing something—be it a phone clip or a rip from a disc—how do you ensure you get the best possible quality? You could use one of the many one-click-style solutions like Media Espresso, which support Intel's Quick Sync Video.

But we're not going to take that easy route. We're going to look at how serious HD video fiends encode their video. It might not be fast, but it's very clever. Along the way we'll cover downscaling for best effect and how to store high-definition video in a small package that retains all the perceivable detail of the original HD footage. –NEIL MOHR

1 KNOW YOUR CONTAINERS FROM YOUR CODECS Before going into encoding in detail, it's important to know your containers from your codecs. You can skip ahead if you're up to speed, but here's a quick rundown of the ones you'll encounter.

» A container is a special file format that combines multiple files into a single one. For video, this is usually a video stream and audio stream, but it can include multiple audio files, subtitles, and other types on top. The most common containers are MKV, AVI, MP4, WMV, and TS.

MKV: Matroska, widely used online and designed to contain anything.

AVI: Audio Video Interleave, expanded to support DivX/Xvid without subtitles.

MP4: Official H.264 container designed to handle H.264, MPEG-2, and DivX/Xvid.

WMV: Microsoft's container format only supports WMV with WMA.

TS: Transport Stream, which is used by broadcasters and usually uses H.264 video.

» The second part of the equation is codecs—the system used to encode the audio and video streams. The terms used here can get confusing, largely because a number of terms mean the same thing and so end up being interchanged. We'll mention audio now, as there's old-school MP3, Dolby Digital (aka AC3), the rarer DTS, and finally, the best choice: AAC.

AAC: A more recent standard that looks similar to AC3 on paper, but is superior at the same bit rates. There are a number of lossless audio formats based on DTS and AC3, but we won't cover those here.

H.264: A high-definition video standard that's used by most broadcasters. x264 is identical but is the open-source encoder, so files produced with this typically take x264 as their format. AVC—also known as MP4 Part 10, also known as MP4 AVC—is the same.

DivX: A closed-source implementation of the MP4 standard. An open-source-compatible format called Xvid was developed. It's similar to H.264.

MPEG-2: Used for DVD encoding and HD broadcasts in the United States as part of a TS file.

VC-1: The video format used on the defunct HD DVD format and also Microsoft WMV9.

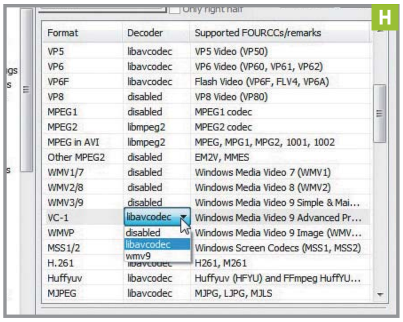
2 DOWNLOAD WHAT YOU NEED For this tutorial we're leaning heavily on the amateur world of high-definition video encoding—the type of everyday genius-level guys who write the x264 encoder, ffdshow, Haali Media Splitter, and all the rest. The only problem is that this involves using a lot of disparate and complex tools to generate professional encoding results.

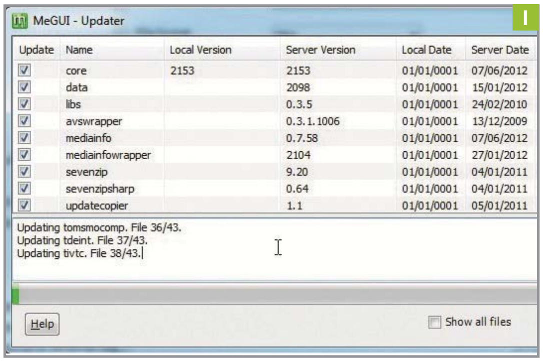
» To begin, we'll get all the tools downloaded, installed, and configured correctly. You may have heard of ffdshow and Haali already. You might have them as part of the CCCP codec distribution, but you'll need to get them again as stand-alone installs. Opt for 32-bit versions. Get Ffdshow from http://bit.ly/RPbHG4, and Haali Media Splitter, also known as Matroska Splitter, from www.haali.su/mkv. While you're at it, also grab AviSynth from http://avisynth.org/mediawiki.

» Ffdshow needs a couple of decoding settings defined. Select Start > All Programs > ffdshow > Video Decoder Settings. Look under the Default Codec section and find MPEG-2. Set Decoder to libmpeg2 and VC-1 to libavcodec (**image H**). This ensures that everything you might encounter in this guide is covered.

» Finally, download AvsP from http://bit.ly/P6eg85 and extract it. We'll need it later.

» The de facto encoding tool at the moment is MeGUI, which is based on a comprehensive encoding tool called Mencoder. You can grab this from http://sourceforge.net/projects/megui. We suggest you extract and run MeGUI.exe, as it'll need to update itself (**image I**), which can take a little while. The last piece of the puzzle is GraphStudio. Download it from http://bit.ly/PGsbxp and extract it.

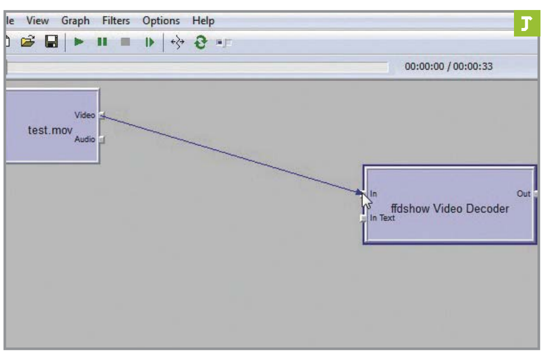


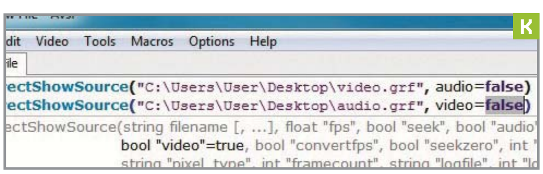


3 CREATE YOUR GRAPH

Fire up GraphStudio, which is a complex bit of DirectXShow voodoo. Select Graph > Insert Filter, under the default DirectShow selection, then double-click Haali Media Splitter, click Browse, and select your video. Now repeat the process, but double-click ffdshow Video Decoder. Two boxes are now displayed in the window. Use your mouse to drag a line from the file's Video pin to the ffdshow In pin (image J).

» Select File > Save graph (.GRF) and name it video.grf. Now, delete the two boxes and repeat the whole process, but select ffdshow Audio Decoder and name the graph file audio.grf. Start AvsP, then drag the video.grf and audio.grf files to the AvsP window individually. Just before each closing bracket, add **audio=false** to the video line and **video=false** to the audio (image K).

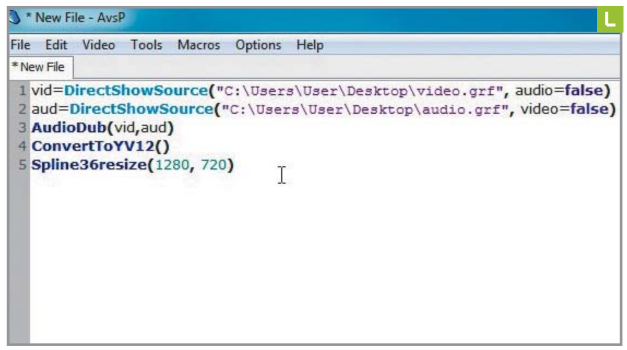




4 WRITE THE SCRIPT

At the start of the first line add **vid=**. Add **aud=** to the start of the second line, and on the third line add **AudioDub(vid,aud)**. On the next line also add **ConvertToYV12()**, which adjusts the color space. We're building a script here that AviSynth will run, which is why it seems like programming. Technically, we just need the video, but having the audio also included can be handy.

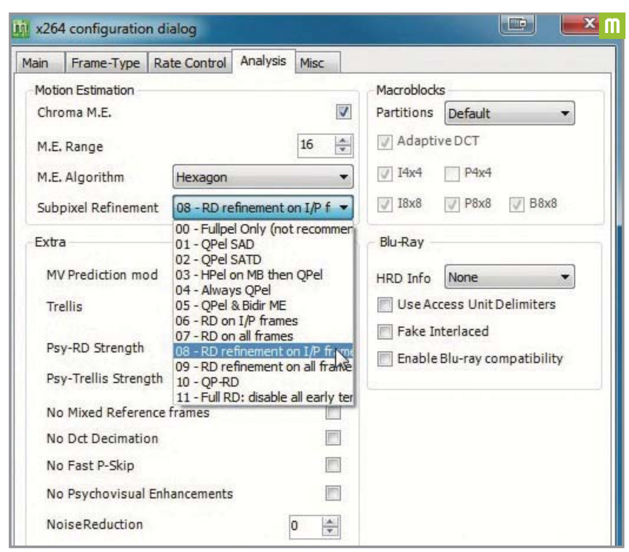
» The script can resize the video to anything you like. Add the line **Spline36resize(x , y)**, with x being the new width and y the new height (image L). After cropping, if the width remains 1,920 you can calculate the new height with this equation: (cropped. height/1,920) * 1,280. Round the number to the nearest whole pixel and you should have an aspect-correct image.

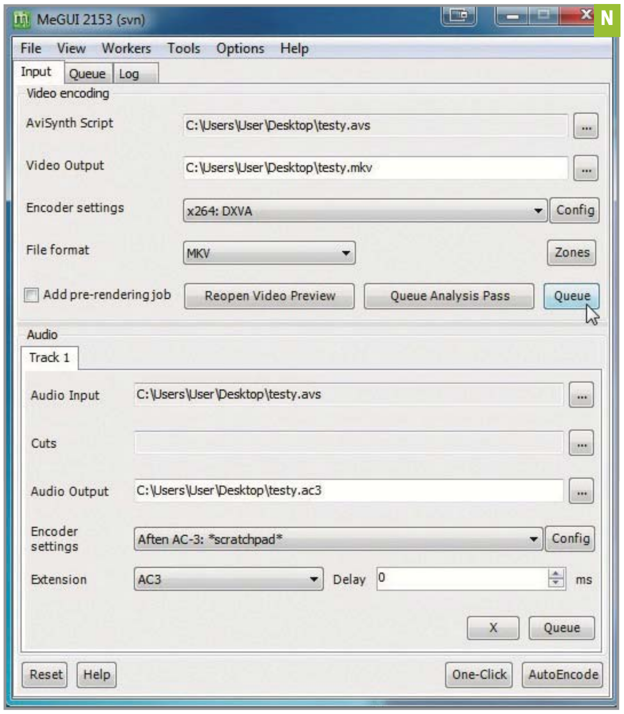


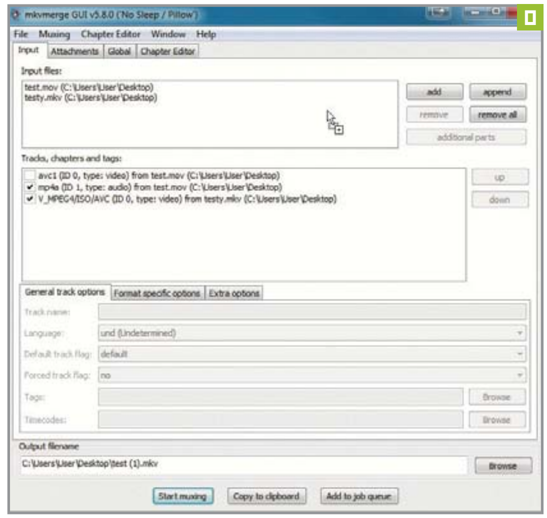
5 GET GUI

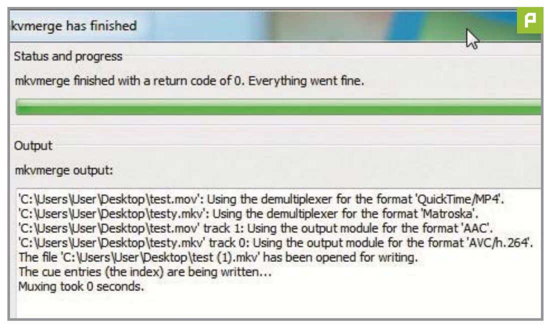
Save the script and fire up MeGUI. This is a complex front-end for the x264 encoder. Under Encoder Settings, make sure x264 is set and click Config. Set AVC Level to Level 4.1, Encoding Mode to Const, and Quality between 18 and 21—18 being best. Tick Show Advanced Setting > Analysis and set Subpixel Refinement to 08 (image M).

» Set File Format to MKV and drag your AVS script to the top AviSynth Script box. Check the video output location and name. Click the top Queue button to encode the video (image N), and use the bottom button to encode the audio. The video will lack audio—see the next walkthrough to fix that.









6 MUX THE AUDIO BACK IN Let us introduce you to MKV-Toolnix, which you can download from www.bunkus.org/videotools/mkvtoolnix. This tool will enable you to extract and combine all manner of streams within any number of container files. Our aim here is to take the old video's audio and then add it to the new encoded file. This is called muxing. Install and run MKVmerge Gui.

» The muxing process is straightforward—you just need to add the files to the input files section at the top of the screen (**image O**). As you do this, the various tracks and elements contained within them are displayed as a whole below. Once you've added the two files, deselect everything, then select the video stream from your new MKV file and the audio track from the original file.

» Enter a final output file name and location in the bottom box, then click Start muxing to generate the final file (**image P**). It shouldn't take long. Once it's finished, test the file and make sure the audio syncs correctly—skip near to the end of the video to check.

» Despite its name, this package doesn't just handle MKV files—it's possible to add a huge range of audio tracks to the Input Files section, from AC3 and AAC to the various DTS tracks. These can then be muxed into the encoded video file. If you're taking this track from MeGUI, then you can be sure that its timing is exactly the same as the encoded video track.

BUILD IT

CHRIS ZELE **INTERN**



An Affordable Linux Gaming Rig

We show you how to pick the best parts, pick the best distro, and put it all together

LENGTH OF TIME: **2 HOURS** | LEVEL OF DIFFICULTY: **INTERMEDIATE**



THE MISSION The free Linux operating system has been around for ages, but its inherent complexity and limited support has always relegated its use to extreme enthusiasts, programmers, and other hardcore types. That might be changing, though, as a lot of loyal PC enthusiasts are less than pleased with Windows 8, and gaming juggernaut Valve has thrown its hat into the ring by launching a Linux version of Steam, its popular online content delivery service. Given the lackluster reception of Windows 8 and the renewed popularity of Linux, we decided to build a Linux gaming box to see for ourselves whether the OS, at this time, could be a reasonable alternative to Windows for gaming.

CHOOSING THE HARDWARE

OUR LINUX MACHINE was built with a low target price of $650 because we wanted this project to be semi-easy to duplicate by anyone. With this in mind, we started with Intel's Ivy Bridge Core i3-3220 processor, as it comes at a reasonable cost, gives us a great upgrade path, and its low TDP of 55W means we won't need a massive CPU cooler or PSU. Our Asus P8Z77-V LE motherboard is also affordable while offering both SLI and CrossFire support, as well as two USB 3.0 ports. Power is provided by a CX430 Corsair power supply from the company's low-cost Builder series. Given our modest build-out, we figured anything bigger than 430W would be overkill.

GPU duties are handled by a Gigabyte GTX 650 video card, which at $120 performs better than a Radeon HD 7750 and should be sufficient for our Linux adventure. The system requirements of the available games are very low, so a more powerful GPU would be wasted. As our budget didn't allow for an SSD, we went with a 500GB, 7,200rpm WD Caviar Blue. We scored 8GB of G.Skill Ripjaws RAM because it was dirt cheap at just $45. Holding all the gear is a Corsair Carbide case, which is just $60 but has USB 3.0 front panel ports, cable routing, and tool-less drive bays.

With the hardware in hand, it's time to build the machine. If you need any guidance putting it together, check out this step-by-step guide from a previous build: http://bit.ly/wNwJyQ.

Now, let's turn your new box into a Linux gaming rig.

INGREDIENTS

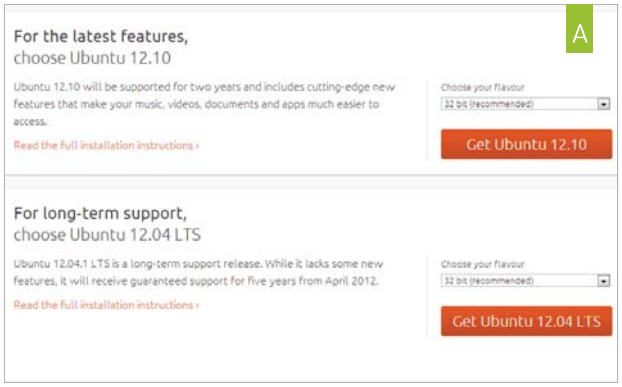
	PART	URL	PRICE
Case	Corsair Carbide 200R	www.corsair.com	**$60**
PSU	Corsair CX430W	www.corsair.com	**$50**
Mobo	Asus P8Z77-V LE Plus	www.asus.com	**$160**
CPU	Intel Core i3-3220	www.intel.com	**$130**
Cooler	Stock Cooler	www.intel.com	**$0**
GPU	Gigabyte GTX 650	www.gigabyte.com	**$120**
RAM	8GB G.Skill Ripjaws	www.gskill.com	**$45**
Optical Drive	Samsung S224BB	www.samsung.com	**$20**
Hard Drive	500GB WD Caviar Blue	www.wdc.com	**$65**
OS	Ubuntu 12.04 LTS	www.ubuntu.com	**$0**
Total			**$650**

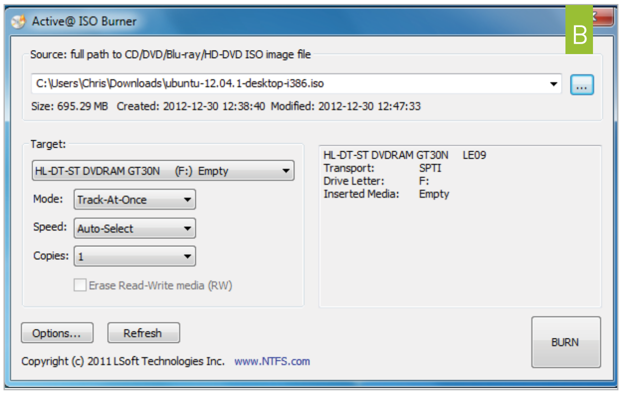
1 DOWNLOAD YOUR DISTRO

WE CHOSE the Ubuntu flavor of Linux for this project because it's considered the easiest to use for beginners. To get started, we headed to the website (www.ubuntu.com) and downloaded our preferred flavor (**image A**). We chose version 12.04 LTS because it will be supported for five years rather than the latest 12.10 version, which will be only be supported for two years. After the download was complete, we prepared to burn the ISO image to a blank CD-R.

2 BURN THE ISO TO DISC

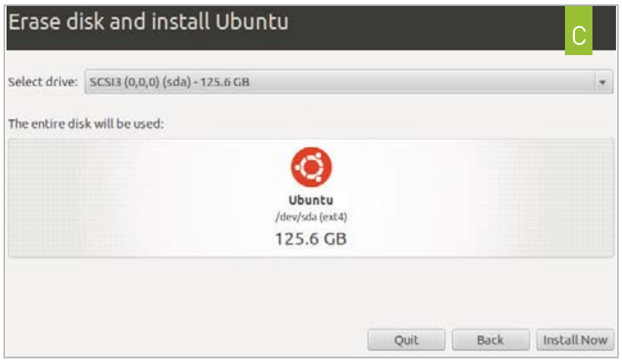
WE HAD TO find suitable software for burning the ISO to CD-R (at 695MB, the distro fits on one disc) since Windows 7 doesn't natively allow burning ISO files like Windows 8 does. After searching, we settled on the free and easy-to-use Active@ ISO Burner. Go to www.ntfs.com/iso-burning.htm for the download, then run it. Browse to the ISO, select your optical drive, and hit the Burn button (**image B**). When it's done, pop the disc into the optical drive of your new guinea rig, and prepare to install Linux.





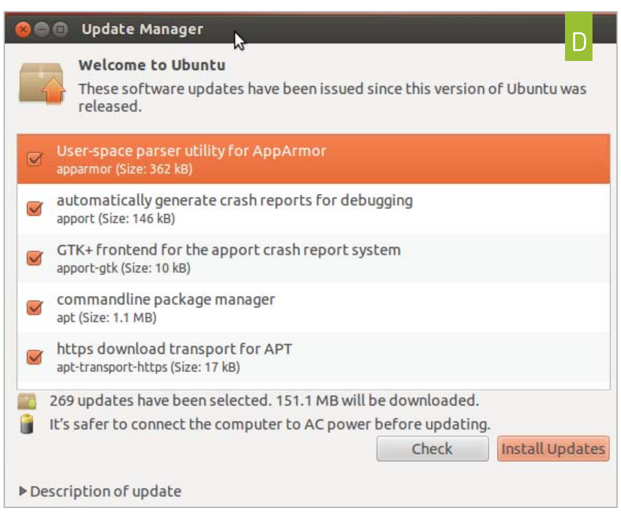
3 INSTALL THE OS

THE BIGGEST DECISION you'll have to make when installing Linux involves drive partitioning (a partition is a chunk of a storage device that appears to the OS as a separate volume). If you're multibooting, install Linux to a separate partition, but if you're like us and just want to run it off one storage device, you can ignore partition options (**image C**). After you've finished (or skipped) partitioning your hard drive, the OS will begin to install. It took about 30 minutes on our 7,200rpm drive, but it will take about 10-15 minutes on an SSD (we tested it just for fun).



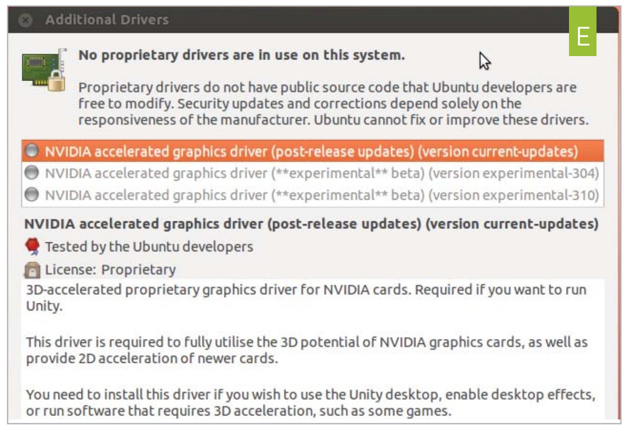
4 UPDATE THE OS

JUST LIKE WITH Windows, the first thing you'll want to do after you've installed Ubuntu is update the operating system. To do so, you will need to grab the latest updates from the Update Manager. Do this by clicking the power button in the right-hand corner of the screen and then clicking Update Manager to see a list of the latest updates; click Install Updates (**image D**). Unlike with Windows, which can take days to get up to date if you're not using a Service Pack, the update process for Ubuntu took about 15 minutes. After that and a single reboot, we were up to date.



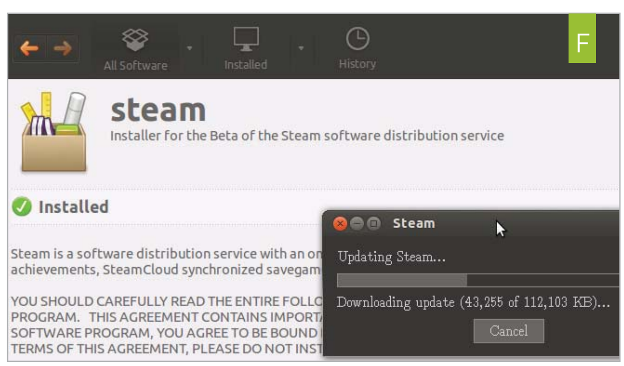
5 INSTALL VIDEO/SOUND DRIVERS

THE LAST THING you'll need to do before installing Steam is to install the latest video drivers and other non-open-source or proprietary drivers, such as those for your motherboard. To install these drivers you'll simply click the green video-card icon in the right-hand corner of the screen, which pops up a window that displays the proprietary drivers for your computer (**image E**). One of the cooler features of Ubuntu Linux is that it finds all the available drivers for your system, so you don't have to visit the manufacturers' website to download them. After you've finished downloading the drivers, you'll need to restart your system, and then you'll be completely set up and ready to tackle some games with Valve's Steam client.



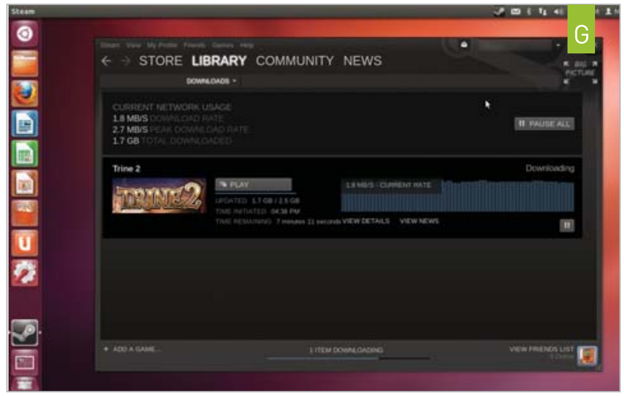
6 INSTALL STEAM

INSTALLING STEAM is fairly simple. Download the client from Valve's website (www.valvesoftware.com) and then double-click it to run the installer, which takes you to Ubuntu's Software Center. This Software Center shows you any newly installed software, and it's where we'll install Steam (**image F**). Once it's installed, you can run the client. But first, you might want to check out other open-source games that are listed in the Software Center, which is a mini app store providing a few games and other small applications for Linux users.



7 SET UP STEAM

AFTER INSTALLING Steam, you will need to log into your account and authenticate your computer via email. You can start installing games on your Ubuntu 12.04 machine (**image G**) after your first log-in. As of this writing, there were 41 games available, and just like in Windows, each of them (aside from TF2, of course) costs money. You will also be able to download any of your previously purchased games that are Linux-compatible (Team Fortress 2, for example). Although 41 games isn't very many, Valve has been adding new titles at a steady clip. The company added 15 of the 41 titles in its Linux library in just the first month of the new Steam client's existence.



LIVING LA VIDA LINUX

OVERALL, WE WERE impressed with the experience we had using Linux for Internet browsing, word processing, and playing games. The OS ran surprisingly well on our modest rig. It booted quickly, shut down in a heartbeat, and handled multitasking without any problems. When it comes to gaming, our feeling is that it handles the games we play just fine, but the test bed of 41 offered by Steam at this time is too small a sample—we want more! We know Steam is not the only supplier of games, but we're still talking about a relatively small gaming universe on Linux. As an example, Steam offers more than 6,000 titles on the Windows platform, so clearly no hardcore gamer can survive on Linux alone. Also, there are zero triple-A titles on Steam for Linux at this time—that right there is a deal-killer for us, at least in the long run. In testing, we sampled Team Fortress 2, Trine 2, and Waveform, and they all ran with ease at 1920x1200 on our budget box, with all settings maxed. We were greatly impressed by just how smoothly the games hummed along.

Just because we can't survive on Linux alone doesn't mean we didn't like experimenting with it on the side, however. Building the Linux gaming box was a fun experience, and we'd recommend any enthusiast take it for a test drive. Besides, both Linux and Steam are free, so trying either one won't cost you a dime.



WHERE ARE THE BENCHMARKS?

We know your eyes are scanning the pages looking for some hard numbers, but sadly, we don't have any benchmarks this time around. We wish we did, but Linux isn't very well supported by software developers who make benchmarking tools. We can tell you that to our eyes, all the games we tested played well on our GTX 650 at 1080p, running at least 30fps at all times. We were never lacking for GPU horsepower, in other words.

We wanted to try out the Phoronix Test Suite benchmarks, but Ubuntu warned us off installing it with a "bad quality" message. Another possible benchmark is x264, but it's designed to test a machine's CPU rather than its GPU, so it wouldn't paint a complete picture of this system's capabilities. Being a gaming machine, most people—ourselves included—are more interested in GPU performance and specific frame rates for games, but again, these numbers are hard to come by. None of the games on Steam have built-in benchmarks, and Fraps is Windows-only at this time, along with 3DMark, Catzilla, and all of the other games and programs we typically use. This situation might change now that Valve is pushing the gate open, but until it does, we'll stick with an old favorite—EyeballMark.



The Phoronix benchmark suite elicits a "bad quality" warning from Ubuntu.

REVIEWS

TESTED. REVIEWED. VERDICTIZED.

INSIDE



VELOCITY MICRO RAPTOR MULTIPLEX XL PAGE 72

Velocity Micro Raptor MultiPlex XL

Is there still room for big a HTCP?

IT'S HARD to talk about Velocity Micro's new MultiPlex machine without thinking back more than 15 years ago, to the earliest days of "PC-TVs" and "PC Theaters."

Back in the late 1990s, vendors such as Compaq and Gateway were pushing Pentium II–based PCs capable of watching DVDs, displaying electronic programming guides, and browsing the Internet, along with other futuristic capabilities, on gigantic *36-inch CRT televisions* (we say that both literally and sarcastically).

In comparison to those early pioneers of living room PCs, the Velocity Micro MultiPlex is like a starship dropping out of warp speed while you look on from a covered wagon trying to get over Donner Pass without having to eat your fellow travelers.

The MultiPlex chassis harkens back to those early PC-TVs, but rather than sporting a 266MHz Pentium II, a whopping 2GB hard drive, 32MB of RAM, and an analog TV tuner, the MultiPlex is pretty much state-of-the-art: liquid-cooled Core i7-3770K clocked up to 4.3GHz, 16GB of DDR3/2000, a GeForce GTX 680, 240GB SSD, and 3.6TB of RAID 5 storage. Besides Gigabit and 802.11n, and the Blu-ray drive, Velocity



The MultiPlex is a traditional HTPC, but fully capable of playing Big Picture Steam games, too.

Best scores are bolded.

SPECIFICATIONS

Processor	Intel Core i7-3770K@4.3GHz
Mobo	Asus P8Z77-V Pro Thunderbolt
RAM	16GB DDR3/2000
Video Card	GeForce GTX 680
Sound Card	Onboard
Storage	240GB Intel SSD, three 2TB WD Caviar Black drives in RAID 5
Optical	Blu-ray combo drive WH14N540
Case/PSU	Custom / Corsair TX850

BENCHMARKS

	ZERO-POINT	
Premiere Pro CS6 (sec)	2,000	2,593 (-23%)
Stitch.Efx 2.0 (sec)	831	788
ProShow Producer 5.0 (sec)	1,446	1,323
x264 HD 5.0 (fps)	21.1	16.7 (-21%)
Batman: Arkham City (fps)	76.0	46.0 (-39%)
3DMark 11	5,847	3,410 (-42%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our current desktop test bed consists of a hexa-core 3.2GHz Core i7-3930K 3.8GHz, 8GB of Corsair DDR3/1600, on an Asus Sabertooth X79 motherboard. We are running a GeForce GTX 690, an OCZ Vertex 3 SSD, and 64-bit Windows 7 Professional.



Micro opted for a Ceton quad-channel CableCARD tuner to help fill that massive RAID 5 array.

That RAID array, for the record, is made up of three 2TB WD Caviar Black drives. If one drive fails, you won't lose it all—we're just not so sure we'd care if we lost it, though. Since the MultiPlex is intended to quietly sit in the living room sucking up television through the Ceton card, a drive failure wiping out, say, every episode of *Glee* or *The Walking Dead*, wouldn't be as bad as losing 2TB of your family videos and pics. Frankly, we think that a straight 6TB JBOD array would be just fine on a PVR box, but if you do intend to store your memories on the machine, the RAID 5 is warranted.

Performance of the box was in line with our expectations. Obviously, up against our zero-point system's hexa-core and dual-GPU setup, it's no contest. But against HTPC/gaming boxes like Digital Storm's Bolt and Falcon Northwest's Tiki, it's pretty much a tie, as all three feature overclocked 3770K parts and GeForce GTX 680 cards. Of course, you might wonder if it's fair to compare the MultiPlex against those much smaller HTPC machines. That's a good question. Both the Tiki and Bolt are more likely to be used as simple SFF gaming boxes in your office, or in your living room as "Steam Boxes" running Big Picture mode. Recording terabytes of TV isn't likely to be high on the list of their usage scenarios.

That's actually where the MultiPlex comes in. It's far more traditional-HTPC shaped and sized for the PVR chores, yet has plenty of firepower to run games at 1080p resolutions. Our one complaint might be that it's a tad loud for pure PVR duties. If you're watching, say, a Michael Bay flick, you'd never hear the fan and drive noise, but if you're trying to catch the nuanced acting in, um, *Jane Eyre* on Blu-ray, you could find those sounds distracting. This won't be an issue in gaming, of course, but it's worth noting.

Pricing for the rig is fair. At $3,200 it's a full grand cheaper than the Falcon Tiki we reviewed last September. The Tiki did, however, pack a pair of 512GB SSDs, which adds up, but then the MultiPlex has three drives plus a CableCARD tuner.

Overall, the MultiPlex brings a lot to the table if you're still living in a cable world—we're just not sure how many of us there are in today's post-cable environment. –**GORDON MAH UNG**

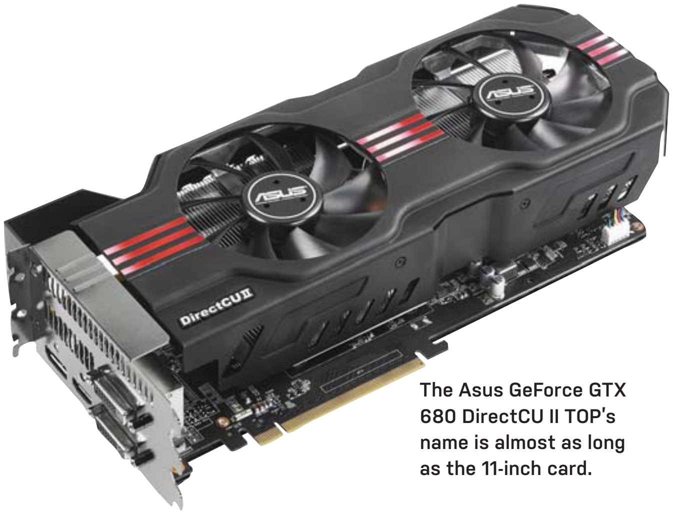
VERDICT 9

Velocity Micro Raptor MultiPlex XL

➕ **BONANZA:** Lots of power and lots of storage under your TV.

➖ **BIG VALLEY** Wee bit loud; will eat up a lot of surface space.

$3,200, www.velocitymicro.com



The Asus GeForce GTX 680 DirectCU II TOP's name is almost as long as the 11-inch card.



The Asus HD 7970 DirectCU II TOP's triple-slot design is an amazing thing to not hear at all.

The Final, Silent Showdown

Two overclocked flagships go head to head one last time

Over the past year, the GeForce GTX 680 and the Radeon HD 7970 have served as the respective flagship GPUs for each of their camps, and even though both cards seem a bit like well-aged cheese by now, they are still as fast as it gets in the single-GPU world, and will be until their successors are unleashed. However, the unleashing may not happen for a few months, and when it does, the new monster cards will be oh-so-pricey, making these "last-gen" super-cards an excellent value. There have also been quite a few driver updates since these cards were released, so we've decided to pit two of the overclocked versions against one another in a battle royale to settle this feud once and for all. Fighters, touch circuit boards and come out of your PCI Express corners. It's time to get it on! –JOSH NOREM

ASUS GEFORCE GTX 680 DIRECTCU II TOP

There are many flavors of GeForce GTX 680 out in the wild, from cards that have only modified the reference design with pretty stickers to this heavily mutated bad boy from Asus. For those not familiar with Asus nomenclature, this is the DirectCU II version of the GTX 680, meaning it features a heat pipe and fan-based cooler approximately the size of mainland China. The cooler utilizes five copper heat pipes that make direct contact with the GK104 Kepler GPU. The heat pipes fan out above the GPU and to the edge of the card, sending the heat they've collected into two separate heatsinks. Twin 100mm fans then blow into the heatsinks, exhausting the warm air outside of the chassis. It's a superb design that we've lavished praise on before because, even though it's a bit large, it works extremely well, and keeps the GPU just the way we like it—cool and quiet. Asus claims a noise reduction of 14dB compared to the reference design prepared by Nvidia, and we believe it even though we don't specifically measure sound output. All this cooling takes up a bit of space, though, and this card's triple-slot design makes it the biggest GTX 680 ever to grace our test bench.

Some of you might be asking, "But wait, the GTX 680 already runs cool and quiet, so why is a cooler the size of Gordon Mah Ung's anger-management therapy bill required in this situation?" That's a good question, and the answer is in the second part of our nomenclature lesson, which is the word TOP in the card's name, which means it's overclocked like a son-of-a-gun to the tune of 131MHz over stock speeds at 1,137MHz. Its Boost Clock gets a gentle massage all the way up to 1,201MHz, as well. Memory is not overclocked, however. The card also comes with Asus's GPU Tweak software that lets you not only monitor the card's temps, fan speeds, voltages, and clock speeds, but also manually adjust all those values. The card even supports an Asus-exclusive feature called VGA Hotwire that's also supported on several Asus motherboards (it has to be supported on both to work). It lets you adjust the GPU's voltage once you've soldered several wires that run from the motherboard to the video card's PCB. This allows for control at a hardware level instead of using software, and is designed for extreme overclocking enthusiasts, to put it mildly.

During testing, the overclocked Asus GTX 680 held a crystal-clear advantage over the overclocked Radeon HD 7970, which might not be too surprising to you, but it was a surprise to us. When we tested these same video cards (not these exact cards, but reference models at stock clock speeds) just a few months ago using the latest beta drivers from each manufacturer, it was a photo finish in practically every test, with AMD holding a very slight advantage. This was a distinct coup for AMD, which had always trailed Nvidia in these comparisons previously, and it all came down to drivers, essentially. AMD had released its beta 12.11 drivers, claiming they made a significant impact on performance, and they were right.

Perhaps it's fitting then, that this time around it is most likely drivers that have put Nvidia ahead, as we tested this card with the 310.70 version of the drivers, which were released about a month after the 12.10 drivers we used to test the Radeon card. As we were going to press, Nvidia released another version of its drivers numbered 310.90, claiming even further improvements, but they arrived too close to deadline for us to test them. However, the advantage Nvidia holds is clear, both in the benchmark numbers and frequency of driver updates. Drivers are clearly a weak point for AMD, and in this face-off it most likely made all the difference.

We should point out that the Asus card

was totally silent at all times during testing, a remarkable feat given its overclocked status and its superb performance. It beat the AMD card in every test except Metro, where it lost by one frame per second, so not much of a loss, really. The numbers don't lie, though, and as we close the book on this era of GPUs, the crown goes to the green camp, and we'll award a crown to Asus too, for making the fastest, and most silent, GTX 680 we've ever tested.

VERDICT 9 K!CK ASS!

Asus GeForce GTX 680 DirectCU II TOP

$540, www.asus.com

ASUS RADEON HD 7970 DIRECTCU II TOP

In the game of high-stakes poker known as the GPU industry, once a manufacturer reveals its hand, it then waits for the competition to do the same. If the competing manufacturer reveals a more powerful or desirable alternative, due to a combination of price, performance, noise, or all three, the other manufacturer will oftentimes update its lineup with a new Extreme Titanium Platinum FTW Balls-to-the-Wall Edition, which is usually mildly overclocked. We've seen both Nvidia and AMD do this in the past, but in this particular round it's been AMD pulling this maneuver with its GHz edition of the HD 7970. The original HD 7970 shipped with a 925MHz core clock speed, and in order to gain a bit of an edge on the suddenly dominant GeForce GTX 680, or at least attempt to match its performance, AMD overclocked its flagship board to 1GHz and released the Radeon-based Kraken. It achieved its goal, too, as the GHz edition of the card was, for the most part, as fast as the GTX 680, or at least the two were close enough to move the argument away from performance to price and other considerations. Unfortunately for AMD, once people began to consider other factors, such as noise and heat, Nvidia still held the edge with its power-sipping Kepler architecture. While third-party manufacturers can't do much about the card's power output, they could certainly change its noise profile, and that's exactly what Asus has done by adding its sizable DirectCU II cooler to this card.

If you want more details on this card's cooler, go back and read the previous review of the GTX 680, as it has a similar cooler, though the designs aren't exactly the same since the cards' layouts are slightly different. The biggest difference is that the HD 7970 features an additional copper heat pipe for a total of six, in comparison to the GTX 680's five heat pipes, but both use 100mm fans and large aluminum heatsinks. This is also a three-slot card (Asus specifies that it takes up 2.5 slots, so you could theoretically slide something extremely skinny in below it), and it's comparable in size to the towering PowerColor Devil 13 HD 7990 we reviewed last month, which features two HD 7970 Tahiti GPUs on a single PCB. The HD 7970 DirectCU II TOP measures 11 inches long, 2.1 inches thick, and 5.1 inches deep. It requires two 8-pin power connectors, which compares to one 8-pin and one 6-pin connector on the standard design. It also includes support for VGA Hotwire.

Like the GTX 680, this card is also overclocked a bit and runs at 1,000MHz, which is 75MHz over its stock speeds. Its memory also has a teeny, tiny overclock up to 1,400MHz from 1,375MHz. The card includes four Display Port connectors along with one single-link DVI port and one dual-link DVI port, giving it a distinct advantage in the multiple-displays department, and allowing you to run all six displays using AMD's Eyefinity setup for multi-monitor gaming.

During testing, the Asus card showed a mild advantage over the reference design, pulling a few frames per second out of its red-and-black hat in each test. In two games in particular, though—Dirt 3 and Far Cry 2—we saw the most improvement, though in Metro we're still stuck in the sub-20fps region, which is simply ridiculous but not the fault of the cards, obviously. Given its overclocked nature, it's not too surprising that it's faster than the reference design, but what's most impressive is how utterly silent the card is at all times; a marked improvement over the reference design, and all other HD 7970s we've ever tested. Sadly, the Radeon card still gets its lunch eaten by the GTX 680 in almost every benchmark, and not just by one or two frames but by enough to make it clear which card is faster. As we stated in the GTX review, it could be down to drivers, as we used the 12.10 drivers for these tests, which are the latest "official" drivers. The 12.11 drivers have been in beta for a while now and might have turned the tide had they been released, but we don't test with beta drivers, so for now the crown goes to the green camp. To be clear, this is the best version of the HD 7970 we've tested in this generation of cards, but given its performance deficit to the GTX 680, we're forced to withhold a Kick Ass award for now. Let's hope the company can reclaim one very soon with its HD 8000 series GPUs.

VERDICT 9

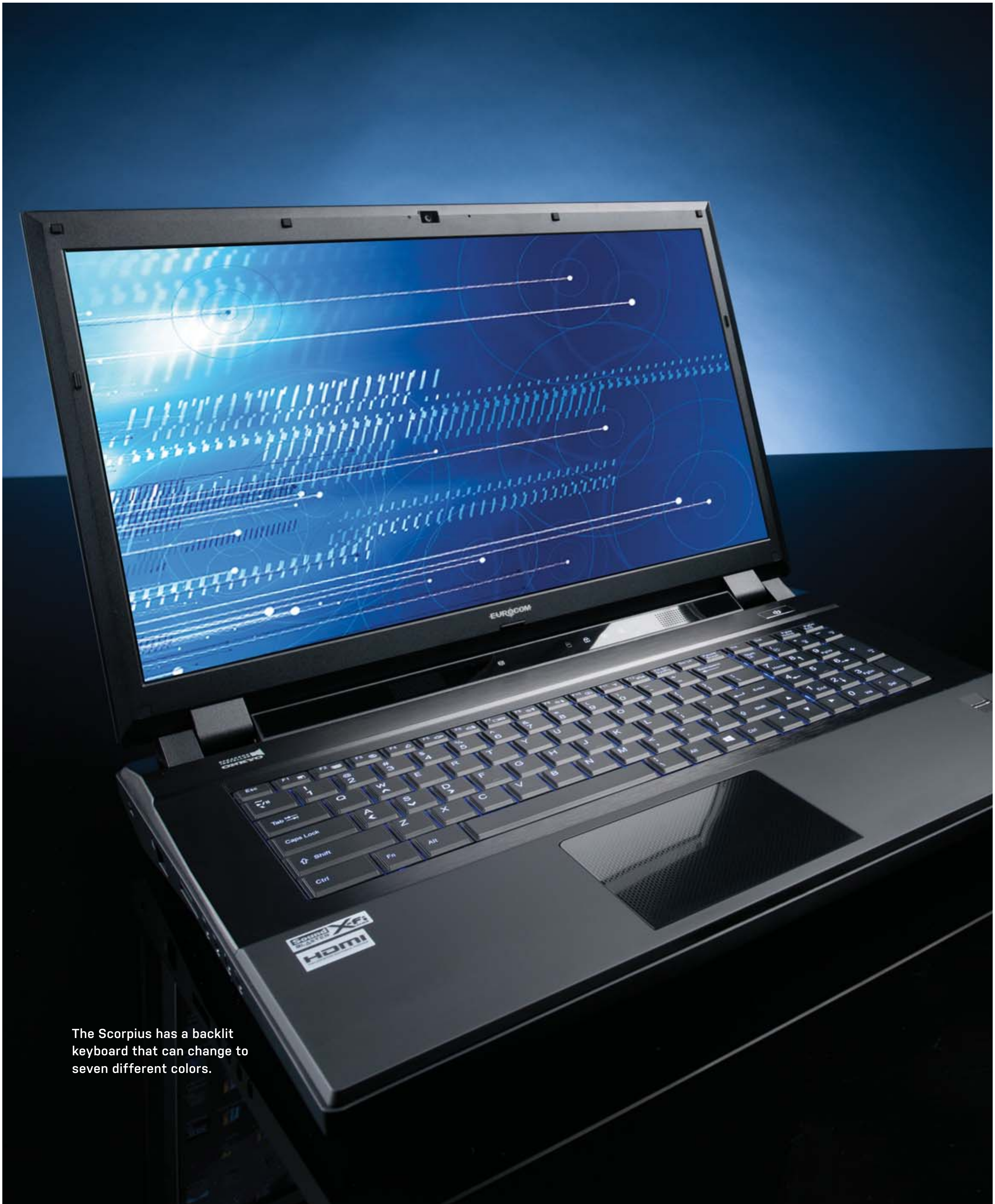
Asus Radeon HD 7970 DirectCU II TOP

$490, www.asus.com

BENCHMARKS

	Asus GTX 680 DirectCU II TOP	Asus Radeon HD 7970 DirectCU II TOP	Reference Radeon HD 7970	Reference GTX 680
3DMark 2011 Performance	**10,886**	8,700	8,337	9,555
Unigine Heaven 2.5 (fps)	**33.1**	28.9	28.7	**31.2**
Shogun 2 (fps)	**37.8**	29.6	25.7	29.8
Far Cry 2 / Long (fps)	**118.6**	97.4	91.6	107.3
Dirt 3 (fps)	**79.3**	75.2	70.5	72.9
Metro 2033 (fps)	17	**18.6**	**18.6**	16.3
STALKER: CoP SunShade (fps)	**41.5**	40.2	38.7	34.3
Just Cause 2 (fps)	**57.71**	53.1	51	54.7
Batman: Arkham City (fps)	**66**	62	60	58
Catzilla	**5,690**	4,427	4,218	4,880
Base Clock	1,137MHz	1,000MHz	925MHz	925MHz
Boost Clock	1,201MHz	N/A	N/A	1,000MHz
Memory Clock	6,008MHz	5,600MHz	5,500MHz	6,000MHz

Best scores are bolded. Our test bed is a 3.33GHz Core i7 3960X Extreme Edition in an Asus P9X79 motherboard with 16GB of DDR3/1600 and a Thermaltake ToughPower 1,050w PSU. The OS is 64-bit Windows Ultimate. All games are run at 2560x1600 with 4xAA except for the 3DMark tests.



The Scorpius has a backlit keyboard that can change to seven different colors.

Eurocom Scorpius

3D notebook offers hefty power for a hefty price

THE EUROCOM SCORPIUS lives a dual life. On one hand, it's a dull-looking workstation; on the other, this highly configurable laptop can also be outfitted with a 3D monitor and killer gaming specs. We opted for the latter.

Along with a 120Hz refresh rate, the 17.3-inch monitor features a built-in 3D emitter that syncs up to a pair of bundled Nvidia 3D Vision 2 glasses. To test the 3D experience, we played the 3D Vision Ready–title Batman: Arkham City and sampled some 3D movie trailers from 3DVisionLive.com. Nvidia's stereoscopic technology rivals the best that movie theaters have to offer in terms of depth, and never bothered our eyes, but the experience wasn't perfect. Even though Nvidia purports to have solved the dimming issue with its Vision 2 glasses, you're still essentially wearing sunglasses, so the experience is going to be darker than viewing content in 2D without glasses. We also feel that wearing glasses in and of itself is cumbersome.

The most vexing problem is that when 3D is enabled, performance suffers greatly. Our frame rate dropped by half, from 50s to mid-20s, when playing Batman in 3D as opposed to 2D. In our opinion, these various issues detract too much from the experience; we'd rather play in 2D mode. As for the TN panel in 2D mode, while some sing the praises of 120Hz's ability to improve even 2D image quality, we didn't see any noticeable improvement over 60Hz performance when surfing the web, watching videos, or playing games.

We had little complaint with our system's internal specs, however, which included a 2.8GHz Intel Core i7-3840QM CPU, 16GB of RAM, and not one, but two GeForce GTX 680Ms in SLI. In our more CPU-intensive tests, the Scorpius scored modest wins of 6–13 percent. However, when it came to the more GPU-intensive applications, our zero-point's comparatively humble Fermi-based GeForce GTX 670M GPU got severely stung by the Scorpius's two Kepler beasts. In our STALKER: CoP benchmark, the Scorpius performed an amazing 112.5 percent better than the ZP; the performance gap only widened in our 3DMark 11 test, where it performed an astonishing 248.1 percent better. Because these benchmark stats were so amazing, we loaded up Far Cry 3 to give it a real workout. While the Scorpius wasn't able to run the super-graphically intensive game on "Ultra" (the game's highest settings), it ran at "Very High" with frame rates in the mid-40s to low-50s range, and often outperformed a 2.8GHz AMD quad-core gaming desktop armed with a GTX 590. It seems unfair to bring up the fact that the far less expensive ($1,500) GT60 zero-point laptop wasn't even able to muster a solid 30fps on FC3's "High" settings. The only performance test where the GT60 bested the Scorpius was in battery life, where Eurocom's laptop lasted a poor 103 minutes. Something's got to give when you're powering two 680Ms.

In terms of storage, the laptop comes with two drives: a 128GB mSATA Micron and 512GB SSD. While the two speedy drives are appreciated, the lack of a hefty HDD really limits the overall package. Luckily, the laptop takes up to three 2.5-inch storage drives and installing an additional HDD requires the removal of just one screw from the bottom of the laptop. Users can also access the motherboard from underneath and swap out the RAM. Eurocom has made the main compartment easily removable, with only four screws holding it in place.

While the laptop certainly performs well, it still has issues. Its trackpad is unresponsive and can be an exercise in frustration to use. Perhaps a bigger problem is that this thing is *heavy*. With a carry weight of more than 13 pounds, the Scorpius is in backbreaker territory. Finally, at almost $4,000, it's very expensive.

Fortunately, most of these issues can be mitigated. You can save money by skipping out on the 3D monitor and second SSD. And you can overlook its battery, weight, and trackpad issues by understanding that the Scorpius is best used as a desktop replacement. Its performance is simply off the charts, and complaining about its other problems is like complaining about how a Ferrari is expensive, bad with fuel economy, and doesn't have enough cup holders. If those issues are enough to bother you, you're looking at the wrong machine. This laptop is all about performance and here the Scorpius is a stinger. –**JIMMY THANG**

BENCHMARKS

	ZERO-POINT	
Stitch.Efx 2.0 (sec)	1,092	945
ProShow Producer 5 (sec)	1,786	1786
x264 HD 5.0 (fps)	12.0	12.8
STALKER: CoP (fps)	32.8	69.7 (112.5%)
3DMark 11 Perf	2,979	10, 370 (248.1%)
Battery Life (min)	187	103 (-44.9%)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Our zero-point notebook is an MSI GT60 with a 2.3GHz Intel Core i7-3610QM, 12GB DDR3/1600, two 500GB Seagate 7,200rpm hard drives, a GeForce GTX 670M, and Windows 7 Home Premium 64-bit. STALKER: CoP tested at 1920x1080 with Ultra settings, Tessellation, and contact hardening.

VERDICT 8

Eurocom Scorpius

+ SCORPION Two GeForce GTX 680Ms; uncompromising performance; 3D monitor (if you're interested).

− SLUG Really expensive; super heavy; horrible trackpad.

$3,915, www.eurocom.com

SPECIFICATIONS

CPU	2.8GHz Intel Core i7-3840QM
RAM	16GB DDR3/1600
Chipset	Intel HM77
GPU	2x Nvidia GeForce GTX 680M 4GB DDR5
Display	17.3-inch, 1920x1080 120Hz LCD LED (matte)
Storage	128GB mSATA 6Gb/s, 512GB SSD 6Gb/s
Optical Drive	Panasonic UJ-260AB Blu-ray
Connectivity	Ethernet, HDMI, eSATA, S/PDIF out, 9-in-1 card reader, DisplayPort, 4x USB 3.0, 1x USB 2.0, audio in, audio out, headphone, mic, 2MP webcam, 802.11n
Lap / Carry	9 lbs, 7.4 oz / 13 lbs, 5 oz



Samsung's vanilla-flavored 840 SSD is the first to use TLC NAND flash, which helps keep the price down.



Corsair's Neutron uses the LAMD controller found in the Neutron GTX, but goes with the less-costly Micron NAND.

Midrange SSD Mayhem

Samsung and Corsair go at it once again

Several months ago, the supreme high-end SSDs from Corsair and Samsung faced off in the Octagon known as the top of our desk area that holds drives being tested. In that blood-curdling battle (in which neither drive moved nor made a sound), the Samsung 840 Pro was victorious, vanquishing its opponent by a slim margin in a contest where zero trash talk was delivered by either storage device. This month, Round Two commences as the companies' value-conscious SSDs clash like cars in a demolition derby by sitting quietly on a test bench while we perform benchmarks upon them. Neither of these drives is as fast as their top-tier brethren, but they are priced accordingly, and both are a damned-good value. –**JOSH NOREM**

CORSAIR NEUTRON SERIES 240GB

The Corsair Neutron is a slightly detuned version of the company's Kick Ass award–winning Neutron GTX SSD. It shares the GTX's all-new Link A Media Device (LAMD) controller, the same slim 7mm form factor, and the same five-year warranty, which is as good as they get these days. The biggest difference between the two drives is the type of NAND flash they use, with the expensive GTX drive boasting the swanky Toshiba 24nm Toggle NAND, and the less expensive Neutron using 25nm ONFI MLC NAND from Micron, which helps keep the drive's price in check. According to the drive's spec charts, the ONIF NAND is significantly slower than the Toggle NAND from Toshiba for write operations, but the two are evenly matched when it comes to read speeds. The GTX also has a slight edge when it comes to 4K random-write IOPS.

We tested the 240GB version of the drive, which is 223GB after being formatted. The extra 16GB of space you can't see or access is used for over-provisioning. The drive comes with a SATA 6Gb/s connector, it supports the Trim command in Windows 7, and is also available in a 120GB capacity. Its bundle includes a 3.5-inch bay adapter but no software.

To test the drive, we ran it through our gauntlet of benchmarks and compared it with the Samsung 840 as well as other drives at its price point. On the whole, the Neutron performed extremely well for a midrange drive, though it didn't top every category of testing. In our top-speed test of sequential reads, it delivered impressive 454MB/s and 363MB/s read and write speeds, respectively, placing it just behind the Samsung in read speeds, and making it the second-fastest in write speeds, just behind the OCZ Vertex 4.

When it comes to incompressible data such as MP3s and video, the Neutron performed respectably in our AS SSD benchmark, again losing slightly to the Vertex 4 but outpacing the Samsung. Corsair claims the drive shines in tests such as this, and though its score isn't top of the charts, it's in line with Corsair's marketing, as its read speeds are stellar, even if its write speeds are a bit slower than the competition.

In our ATTO 64K sequential-read and -write test with a four-command queue, the Neutron was about on par with the Vertex 4 in read speeds but back-of-the-pack in write performance by a small margin. Where the Neutron really shines is in high I/O scenarios such as our Iometer test, which pummels the drive silently via software with a queue of 32 4K random write requests. In this test we saw the Neutron deliver a beatdown on every other drive we tested, and its score of 80,466 IOPS puts it in the same league as its much more expensive top-tier competitors. It also threw down the gauntlet (despite not having arms) in our real-world PCMark Vantage test, racking up a surprising score of 70,030, which is impressive for a drive of this price range. In our final test of Premiere Pro, the Neutron hung with its compatriots, so there's nothing special to report on that front.

All in all, the Neutron impressed us with its speed, warranty, and price point. It's not quite as inexpensive as the Intel 335 or the Samsung 840, but it's faster. When compared to the Vertex 4, though,

it loses in most tests by a healthy margin even though the two are priced the same. That makes it a nail-biter since both drives have a five-year warranty and the Vertex 4 is a little long in the tooth. But the numbers don't lie—the OCZ drive is faster.

VERDICT 9
Corsair Neutron Series 240GB
$225, www.corsair.com

SAMSUNG 840 SERIES 250GB

By now, you've probably heard of the Samsung 840 Pro—it's the new fat cat in town in the SSD world, and sits atop our benchmark charts lazily cleaning itself while peering down at all the other SSDs clamoring to take its place. That drive is redonk, but there's only one problem—it's quite expensive at $250. To satiate those who want a Samsung SSD but don't have two-fiddy lying around, Samsung introduced its midrange drive, the 840 Amateur (that's what we are calling it). The big deal with this drive is that it features an all-new kind of NAND known as TLC instead of using the very common MLC NAND (literally every consumer SSD on the market uses MLC). TLC stands for triple-level cell as opposed to multi-level cell, as it stores three bits per cell instead of two. More bits on the same wafer means higher capacities without increasing cost, but there's a catch—TLC NAND has lower overall endurance than MLC NAND, but don't get too worked up over it. Though the drive only has a three-year warranty, as opposed to the five-year warranty of the Pro version, it's still rated to run for a decade under normal consumer-usage patterns.

The drive itself features a slim 7mm form factor in case you want to stuff it inside an Ultrabook, and it rides the SATA 6Gb/s rails. Its bundle includes Samsung's SSD Magician utility, which handles everything from drive diagnostics to data migration and more, but it lacks a 3.5-inch bay adapter. It's available in 120GB, 250GB (seen here), and 500GB versions; the 250GB version we tested is 232GB after formatting.

During testing, the 840 performed admirably, especially in sequential-read speeds, where it was the fastest drive in both the tests we use to measure this metric. In CrystalDiskMark it saturated the SATA 6Gb/s bus at 523.6MB/s, but its sequential-write speed was its Achilles' heel at just 260.1MB/s. The OCZ Vertex 4, by comparison, is twice as fast. Its performance was similar in our four-command-queue test with a 64K file size, hitting 530.2MB/s read and 265.9MB/s write speeds in ATTO.

The drive deals pretty well with incompressible data too, taking the top spot in our AS SSD test for 4KB-write IOPS, but placing mid-pack in 4KB reads. When dealing with a heavy queue of 32 4K write commands, it placed third overall; not too shabby considering it's the least-expensive drive here.

In our real-world PCMark Vantage test, its score of 56,482 was again third-best, so it's once again better than average. Its Premiere Pro 20GB write-test time of 241 ties the OCZ Vertex 4, but all the drives are very close in this test, suggesting it's CPU-limited.

In our estimation, there's nothing wrong with the Samsung 840 SSD. It's a low-cost SSD, so you have to consider that factor when examining the benchmark scores. All the Internet rumors about TLC NAND being unreliable are just that—rumors. Nobody has worn out a TLC NAND device yet, and it would take quite a long time to ever do so; the same goes for MLC NAND, so don't believe the trash talk. Also, we should point out that Samsung is not an SSD manufacturer that has a reputation for being unreliable. That said, aside from its excellent sequential-read speeds, there's not much else to get excited about with this SSD. It's a low-price drive with decent-to-great performance, and that's the bottom line.

VERDICT 8
Samsung 840 Series 250GB
$180, www.samsung.com

BENCHMARKS

	Corsair Neutron	Samsung 840 Series	Intel 335 Series	OCZ Vertex 4	Crucial M4
Controller	LAMD LM87800	Samsung MDX	SandForce SF-2281	Indilinx Everest 2	Marvell 9174
Capacity	240GB	250GB	240GB	256GB	256GB
Price	$195	$180	$185	$200	$200
CrystalDiskMark					
Avg. Sustained Read (MB/s)	454.6	**523.6**	470	432.9	500
Avg. Sustained Write (MB/s)	363.3	260.1	240.8	**500.9**	193.2
AS SSD					
4KB Read (IOPS)	6,684	5,926	5,849	**7,779**	6,741
4KB Write (IOPS)	16,963	**18,245**	17,429	17,752	10,010
ATTO					
64KB File Read (MB/s)	385	**530.2**	502.3	390	200.4
64KB File Write (MB/s)	379	265.9	430.5	**507**	449.7
Iometer					
4KB Random Write 32QD (IOPS)	**80,466**	62,937	48,289	74,143	29,632
PCMark Vantage x64	**70,030**	56,482	47,751	43,956	66,915
Premiere Pro Write (sec)	243	**241**	246	241	258

Best scores are bolded. Our current test bed is a 3.2GHz Core i5-3470K processor on a Gigabyte Z77X-UP4TH motherboard running Windows 7 Professional 64-bit. All tests used onboard 6Gb/s SATA ports with latest Intel drivers.

Vizio CA24T-A4 All-in-One PC

Bringing the sexy back—minus a few key components

SMART TVS are basically dumb PCs, so it shouldn't come as a surprise that Vizio—one of the world's most successful HDTV manufacturers—plans to grow by jumping into the all-in-one PC market. Vizio's CA24T-A4 is a surprisingly good rookie effort, but there is room for improvement.

The 24-inch, 10-point touchscreen display is crisp, clear, and very thin (about .75 inches). It's an MVA (multi-domain vertical alignment) model, with an LED backlight. Resolution is 1920x1080 pixels, which is typical of this class of machine (Vizio also offers higher-end models with 27-inch displays at the same resolution).

The display is mounted to a thin stalk rising from the pizza-box base that houses the machine's guts. The display can tilt from minus-5 degrees to plus-20 degrees, which is fine for using the PC from a seated position, but it doesn't tilt back far enough to use the machine while standing. Unlike the displays on the Asus E2300 and Lenovo A720, it can't be folded flat. It also doesn't pivot or swivel left to right.

The CA24T-A4's base is incredibly small—at just 1-inch high, it's even thinner than the svelte Lenovo A720—but Vizio removed two important components to achieve that profile: The computer has neither a discrete GPU nor an optical drive. You won't mind integrated graphics unless you're a hardcore gamer, and the absence of an optical drive won't matter if you acquire your movies, music, games, and other software online. But Intel's dual-core 2.5GHz Core i5-3210M CPU and its HD4000 graphics is a 98-pound weakling when it comes to modern gaming with eye candy turned up, and we were grateful to have a USB DVD drive on hand to install some of our benchmarks. Gaming performance on the box could have been helped with higher-clocked RAM, but alas, Vizio went with DDR3/1333.

Vizio outfitted the CA24T-A4 with four USB 3.0 ports, two HDMI inputs (so you can connect both a satellite/cable set-top box and a gaming console or Blu-ray drive), and an eSATA port (which we'd happily trade for Thunderbolt for forward-looking compatibility). Everything except one USB port is in the back of the machine, so you won't have ugly cables sticking out of its side; and unlike many AiOs we've tested, Vizio doesn't hijack any of its USB ports to host a wireless dongle for keyboard and mouse. Actually, Vizio doesn't put a mouse in the box—it provides a wireless multitouch trackpad, instead. Vizio tells us that this is to take advantage of Windows 8 gestures, but we can't say we're enthused about it: Trackpads are necessary on laptops, but they don't deliver a lot of benefit paired with a desktop rig (unless you're using the PC from the couch, and that's an unlikely scenario with just a 24-inch display).

Vizio's all-in-one delivers much better sound than we've heard from most computers, thanks in part to the presence of a subwoofer cleverly integrated into the computer's detached power supply (Asus offers a sub for its all-in-ones, but at additional cost with most models). There's a volume control and an HDMI toggle switch conveniently integrated into both the keyboard and the remote control. That's a much better solution than integrating these features into the display, as Asus and Lenovo do. You can also use the HDMI display without needing to power up the computer (the keyboard controls don't function in this situation, but the remote does).

The Vizio CA24T-A4 delivered very weak benchmark numbers. If you care about performance, the similarly priced Asus E2300 crushes it, thanks to its higher base clock, larger cache, and dedicated GPU. But if you anticipate using the Vizio's HDMI display capabilities as much as its computing power, it's the better buy. –MICHAEL BROWN

SPECIFICATIONS

	Vizio CA24T-A4	Asus ET2300INTI-B022K
Price	$1,250	$1,300
CPU	2.5GHz Intel Core i5-3210M	3GHz Intel Core i5-3330
GPU	Integrated	Nvidia GeForce GT 630M
RAM	6GB DDR3/1333	8GB DDR3/1600
HDD	1TB (5,400rpm)	1TB (7,200rpm)
Optical	None	DVD burner
Display	24-inch, LED-backlit, MVA LCD 1920x1080 (10-point touchscreen)	23-inch, LED-backlit, IPS LCD 1920x1080 (10-point touchscreen)

BENCHMARKS

	Vizio CA24T-A4	Asus ET2300INTI-B022K
3DMark 11	P425	**P1,332**
Metro 2033 (fps)	9.19	**22.1**
Adobe Premiere (sec)	811	**470**
MainConcept (sec)	1,750	**1,128**
ProShow Producer (sec)	1,068	**556**

Best scores are bolded.

VERDICT 7

Vizio CA24T-A4 All-in-One PC

+ **CHEERIO** Two HDMI inputs; great remote control; good integrated speakers (for an all-in-one).

− **OLEO** No mouse; integrated graphics; poor benchmark performance.

$1,250, www.vizio.com





The tiny keyboard delivers surprisingly good tactile feedback.

The satellites tilt
up to project sound
at your ears.



Logitech Z323 2.1-Channel Speaker System

Cheap thrills

LOGITECH HAS BUILT more computer speakers over the years than just about any manufacturer, and it's learned a thing or two about building decent low-cost models. Take the 2.1-channel Z323 system: We could name any number of speaker systems that sound better, but few that are priced better.

You can literally see some of the ways that Logitech hit that low price point: The satellite cabinets are made from cheap ABS plastic with permanently attached cables that plug into the subwoofer. Each satellite has dual, 2-inch, concave-dome drivers (one is mounted in the front of the cabinet and the other in the back, to deliver what Logitech describes as "360-degree sound"). So the system performs best if there's a wall behind the satellites for the sound waves to bounce off. Each satellite also has a front-facing port. There's a volume control and power switch on the right-hand cabinet, plus one 1/8-inch headphone output and one 1/8-inch stereo input, to support a digital media player.

The compact subwoofer cabinet (it measures 8.7x5.9x7.2 inches) is fabricated from the typical medium-density fiberboard. It houses a small amp and a tiny (for a sub) 4-inch down-firing dome woofer. The amp delivers six watts (RMS) to each of the satellites and 18 watts (RMS) to the subwoofer. The sub has its own volume control, along with a pair of RCA jacks that serve as a second auxiliary input for a gaming console, DVD player, or what have you (handy features in a speaker system priced this low).

The Z323's favorable price/performance ratio, however, applies to games much more than music. Playing games such as Borderlands 2, we were pleased with the Z323's ability to render the sound of gunshots and explosions, and the conversations with friendly characters and the taunts of enemies alike were rendered crisp and clear (well, with the exception of those babbling psychos).

When we listened to music, on the other hand, the vocals sounded weirdly detached from the rest of the band—and it didn't matter whether the singer was male or female or even what style of music was being played. We tried several singer/songwriters, including "Crossing Muddy Waters," from the John Hiatt album of the same name, Marc Cohn's "She's Becoming Gold," from *The Rainy Season*, and Nanci Griffith's cover of Townes Van Zandt's "Techumseh Valley," from her record *Other Voices, Other Rooms* (in all three cases, the tracks were ripped from CD and encoded as 16-bit, 44.1kHz FLAC files).

This sonic detachment wasn't as much of a problem with instrumental selections, but that's not to say the Z323 system delivered a stellar performance. When we played Mike Oldfield's *Tubular Bells*, which the composer recently re-mastered for Bowers & Wilkins's Society of Sound label, the album (available in both Apple Lossless and 24-bit FLAC formats), sounded somewhat lifeless and flat compared to what we heard on more expensive speakers (including Corsair's stellar SP2500 system). But you could almost buy four Z323 setups for the cost of one SP2500, so that's to be expected.

If you're working with a tight budget and need speakers primarily for gaming, Logitech has a good set in the Z323. If listening to music is your core interest, on the other hand, you should keep looking. –MICHAEL BROWN

SPECIFICATIONS

Amplifier Power	Satellites: 6 watts (RMS) x 2 Subwoofer: 18 watts (RMS)
Satellite Cabinet Material	ABS plastic
Subwoofer Cabinet Material	MDF
Satellite Drivers	2-inch concave dome
Subwoofer Drivers	4-inch down-firing dome

VERDICT 7

Logitech Z323

+ LOGIC Two sets of inputs; integrated headphone jack; convenient volume control.

− DELUSION Low fidelity; fixed-length cables; very small subwoofer.

$70, www.logitech.com



The H80i's water block features a logo that can change color according to temperature.

Corsair Hydro Series H80i

Super cool in every respect

WHEN CORSAIR released its closed-loop H80 water cooler in 2011, we found it to be one of the best-performing dual-fan kits available. It was also very loud at full blast and cumbersome to install. The updated H80i model sets out to address these issues while also improving performance.

At first glance, the H80i doesn't appear to differ much from its predecessor, but there are a number of key upgrades. First, at 1.4cm thick, the coolant tubes are nearly twice as fat to help increase coolant flow. Also, the two 12cm fans are now based on Corsair's high-static-pressure Air Series SP120 fans and run a bit quieter than the previous model's fans. Finally, Corsair now includes its Corsair Link software with the kit, rather than making it an expensive add-on, allowing you to control all the functions of the kit from within Windows. The software provides a range of controls for fan and pump speeds and overall performance, its coolest feature being the ability to customize color changes to the logo on the water block according to CPU temperatures. For anything below 70 C, we had the light shine blue and anything above displayed red.

Corsair has gone to great lengths to simplify the installation process, as it includes one of the best manuals we've seen, with clear instructions and excellent diagrams, and the parts are all easy to combine, as well. First, you attach a backplate (the H80i supports all modern CPU sockets except for Intel's LGA775), then tighten four standoffs around the CPU socket. Where Corsair has really simplified things is with its magnetic mounting bracket, which just slides onto the top of the water block until it snaps into place. Mounting the water block onto the CPU also requires just four screws, and then eight screws are needed to sandwich the radiator between the two fans and the chassis. The last step is to plug the fans into the water block and connect the system's three cables (SATA for power and fans; USB for the software) into their respective plugs.

Though that's more cables than we're used to seeing for a CPU cooler, the added functionality they offer is worth it. The Corsair Link software offers you a choice of more than a half-dozen preset fan speed profiles (Quiet, Performance, Balanced, and more) and also allows you to customize and save your own presets. You can set individual fans to specific RPMs, or set specific temperature ceilings at which they spin up. The icing on the cake is that the highly tweakable software is easy to use.

When we set the kit to quiet mode using Corsair Link, the cooler was near silent and outperformed our zero-point Hyper 212 Evo air cooler by almost 4 C under load. When we switched to performance mode, the fans revved up appropriately and sounded like a small wind tunnel, but its cooling performance was unmatched in its class, beating its very cool predecessor by roughly 3 C, and Thermaltake's Water2.0 Pro dual-fan kit by 4 C. It also decimated our zero-point air-cooler by over 11 C.

The H80i isn't without its issues. At 110 bucks, it's expensive, and it should include a software CD (the software is available as a download), but those are our only complaints. We like that it has the flexibility to be either super cool under load or amazingly quiet at idle, and everything in between, thanks to its elegant software. When you factor in its simple installation process and nifty LED options, it's clear Corsair has a winner on its hands with the H80i. –JIMMY THANG

BENCHMARKS

	Corsair H80i (Quiet mode)	Corsair H80i (Performance mode)	CM Hyper 212 EVO (Performance mode)	Corsair H80 (Performance mode)	Thermaltake Water2.0 Pro (Performance mode)
Ambient Air	25.4	25.2	23.8	23.2	21.2
Idle Temperature	35.2	33.3	36.2	34.9	32.2
Burn Temperature	70.3	**62.6**	74	65.3	66.6
Burn – Ambient	44.9	**37.4**	50.2	42.1	45.4

All temperatures in degrees Celsius. Best scores bolded. All tests performed using an Intel Core i7-3960X at 4.2GHz, on an Asus P9X79 Deluxe motherboard with 16GB DDR3/1600, in a Thermaltake Level 10 GT with stock fans set to High.

VERDICT 9 KICK ASS!

Corsair Hydro Series H80i

+ THE DARK KNIGHT Great cooling performance; very customizable fan speeds; simple installation.

– THE DARK KNIGHT RISES Expensive; Corsair Link software should come in the box.

$110, www.corsair.com

SPECIFICATIONS

Radiator Dimensions (H x D x W)	4.7 x 5.9 x 1.5 inches
Weight	2.65 lbs
Stock Fans	2x 12cm
Socket Support	LGA1155/1156/1366/2011; AM2/AM2+/AM3/AM3+/FM1
Additional Fan Support	N/A



You're looking at the best Windows Media Center Extender we've tested.

Ceton Echo Windows Media Center Extender

Xbox? We don't need no stinkin' Xbox!

UNTIL THE ECHO hit the street, the Xbox 360 was pretty much the only Windows Media Center Extender still on the market. Companies such as D-Link and Linksys discontinued their extenders years ago—probably because they couldn't compete with the subsidized price of Microsoft's gaming console.

In case you've forgotten what a Windows Media Center Extender is, here's a quick refresher: Plug one of these networked devices into your TV, pair it with a Windows computer on the same network, and the Windows Media Center user interface from that PC—along with all the movies, photos, and music that PC can access—will stream though the extender to the TV.

If the paired PC is outfitted with a TV tuner, you can also stream live TV. We tested the Echo with an over-the-air USB ATSC tuner (AVerMedia's model H826SK) connected to an outdoor antenna and got great results. If you subscribe to cable TV and equip your Media Center PC with a CableCARD tuner (from Ceton or any other manufacturer), you can stream any channel you subscribe to, including premium channels such as HBO and Showtime (but not on-demand programming). On top of that, you can record live TV onto the PC's hard drive, much like a TiVo or other brand of DVR that you might rent from your cable company.

The Echo sells for $180—about the same street price as a 4GB Xbox 360. But being about the size of a paperback book, the Echo is a fraction of the Xbox 360's bulk, and Ceton claims that it draws about 90 percent less power.

The Echo connects to your TV via HDMI, and it draws power from a supplied USB power adapter. It requires a hardwired Ethernet connection, and the company recommends that the host PC also be hardwired to your network. If you don't have CAT5 cable in your walls, the company recommends deploying either a powerline or MoCA (Multimedia over Coax) network.

The Echo user experience is pretty much identical to using a DVR, with a couple of exceptions: Ceton's remote control is craptastically generic. More importantly, you can fast-forward and rewind recorded TV; but unlike a DVR, you can't rewind live TV unless you're also recording it. You can cure the first problem by purchasing Ceton's Companion app for Android or iOS devices ($5 each) to turn your phone or tablet into a remote.

As with those "whole-home DVR" systems you see advertised on TV, you can pause playback on the TV that's connected to your PC in one room, go to a TV connected to an Echo in another room, and pick up where you left off. Up to five Echo devices can be linked to a single PC running Windows Media Center, and if that PC is equipped with multiple tuners, each Echo can tune to a different channel.

If you want to stream Internet video and media stored on your network, something like Western Digital's WDTV Live is a better choice; out of the box, the Echo supports only the media formats that Windows Media Center supports. That list includes codecs such as MPEG-2, H.264, and MP3, but not container formats such as MKV or lossless audio codecs such as FLAC. If you want to tune into and record cable or broadcast TV, and you don't care about Xbox games, the Echo is the way to go.
–MICHAEL BROWN

VERDICT 8

Ceton Echo

+ ECHO CHAMBER Fabulous picture quality; works with OTA tuners and cable TV; consumes very little power.

– STAR CHAMBER Doesn't support media containers, such as MKV; crappy remote control; incompatible with Windows 8.

$180, www.cetoncorp.com



Android-based smart boxes may be the future, but probably not this one.

MiniX Neo X5

Put some actual smart in your TV

WE HAVE SOME bad news for you and you're not going to like it, as few parents ever want to hear anything negative about their baby. Well, here it is: Your so-called Smart TV really isn't that smart.

Sure, the guy in the blue shirt said that your fab 60-inch plasma was top of its class and graduated cum laude, but the truth is, your TV spent most of its schooling playing beer pong and is a actually a class-A moron. The only reason it's called "Smart" is because it was pledged as a legacy.

That's where MiniX's new Neo X5 comes in. Running Android Ice Cream Sandwich, this inexpensive black box gives your TV an actual browser and access to applications that aren't coded in the language Ass++.

The Neo X5 sports a dual-core Rockchip RK3066 ARM processor with a quad-core Mali 400 graphics chip, 1GB of RAM, and 16GB of storage. For connectivity, it has 802.11n, Bluetooth, HDMI 1.4a, Fast Ethernet, and an optical S/PDIF out. For additional storage, the Neo X5 has an SD slot. MiniX even includes a short HDMI cable and USB OTG cable. For those of you who don't subscribe to *Obscure Ports Quarterly*, OTG lets you use the box's Micro USB port as a standard USB port, or—if we could figure it out—hook the Neo X5 to a PC's USB port to use as a storage device. Think of it as a USB port that swings both ways.

As we said, we couldn't figure it out and that's perhaps one of the most vexing problems with the Neo X5. It's pretty much stock Ice Cream Sandwich, but a lot of things were simply not intuitive or not working. We couldn't, for example, figure out how to zoom in or out, and many apps that are intended for touch just didn't work correctly for us. Granted, we were using it with a wireless keyboard and mouse, but that's how the device would normally be used in a living room since the remote it ships with feels like it came out of a gumball machine.

The performance of the Neo X5 didn't impress us, either. It felt sluggish in most instances, with a subpar user interface. Some benchmarks told us otherwise. We compared it to a Tegra 3–based Nexus 7 (admittedly not the most direct comparison, but a good measure of relative Android performance) and the X5 took most of the wins. The Nex7 certainly felt smoother but that's likely due to Jelly Bean and its Project Butter improvements.

Overall, the Neo X5 feels underspec'd to us. Even the display at 1080p output looked so soft we had to double-check which mode it was in. Security is also an issue, as there is no way to secure the unit. Since you'd be logged into your Gmail account at all times on it, you're leaving your email fly down for anyone on the device.

The Neo X5 is mainly marketed as a media player and it does fine there—to an extent. We could play various MP4 files, from GoPro cams to handycams to still images without hiccups, and there is an extensive set of codecs supported. Netflix was also fine but did exhibit more compression artifacts than we expected. YouTube videos were also pretty low-res despite being checked off as "HD."

What we have here is essentially a work in progress. As is, it's still far more usable and much faster than 95 percent of the "Smart" televisions on the market, but there's much improvement to be had. MiniX is promising a Jelly Bean update at some point that may greatly change the experience—which it needs. –GORDON MAH UNG

BENCHMARKS

	MiniX Neo X5	Nexus 7
CPU	Dual-core Rockchip RK3066 Cortex A9	Quad-core Nvidia Tegra 3 Cortex A9
GPU	Quad-core Mali 400	12-core GeForce ULP
OS	4.0.4	4.2.1
RAM	1GB	1GB
Vellamo HTML5	**1,402**	1,334
Vellamo Metal	**489**	355
Vellamo Video	**70**	50
Vellamo Octane	**1,772**	1,376
Basemark GUI Native Resolution	40.7	**44.7**
Basemark GUI 720p	38.36	**88.1**
Basemark ES 2.0	**29.31**	12.28

Best scores are bolded.

VERDICT 6

MiniX Neo X5

+ **MANNIX** Low cost; sips power.

− **MCCLOUD** Can't secure unit; wonky with some touch apps.

$110, www.polywell.com



Tagging enemies shows their location and status, and planning these ambushes is the best part of the game.

Far Cry 3

The best Far Cry game yet—but it's not without flaws

THERE WE WERE, driving down a bumpy, pothole-ridden dirt road, when the on-screen indicator for enemies suddenly lit up like the muzzle flashes from the car we had just driven past. Several of the other car's passengers fired some rounds into our beater car's engine block, forcing us to bail out while the aggressors flipped a U-turn to come back and finish the job.

We watched as the car full of enraged maniacs approached, and then giggled as it careened over the edge of the rocky path, its driver unable to control the car's rapid acceleration on the narrow road. Curious about their fate, we sauntered over to the area where the vehicle swerved off the path and suddenly heard the engine of *another* car coming toward us from just up ahead, so we instinctively ducked into the bushes since we were low on ammo. As we watched the second car stop right next to our now-burning vehicle, we saw the bad guys dismount to have a look-see; then our car suddenly exploded, which caused their car to explode as well, killing all of them and creating a massive, bloody fireball. As we stared at the smoldering wreckage and bodies strewn everywhere, we were just about to congratulate ourselves for a well-executed skirmish when from out of nowhere a royally pissed-off Cassowary—think Big Bird, but blue—appeared and mistook us for a human scratching post. After putting him down as fast as we could, we took his pelt then leapt off the nearest cliff, gliding in our wingsuit to a camp down below to replenish our ammo.

Of course, none of this was scripted or even part of the game's main story; it was just a random encounter we had while en route to an actual part of the game, and it's what makes Far Cry 3 one of the most entertaining—and unpredictable—games we've played since Skyrim. This is one game that, like Skyrim, will be different for everyone who plays it, and the game excels at the times when it lets you do whatever the heck you want to do, which is about 90 percent of the time. Sadly, you can't always do whatever you want, and are forced to jump through very specific hoops a lot of the time, or sit through cutscenes and boring dream sequences way too often throughout the game's lackluster main storyline.

Once the main story cuts you loose, you get back to the real meat of the game—hunting wildlife and clearing enemy outposts. However, in order to unlock all of the game's special skills, such as running faster, taking less falling damage, etc., you *must* progress through the game's story, which by the end leaves you cold and ready to leave Rook Island, never to return. To put it bluntly, this is a game that starts out extremely strong, and slowly gets worse as you progress through it, though it is punctuated with some of the



Blowing up enemy vehicles with a grenade launcher is an orgy of explosive carnage.



Just like real wildlife, the animals in the game don't take too kindly to strangers.

best first-person combat we've ever experienced on the PC.

The game begins with one of the best opening sequences in recent memory, as it shows you and your friends living it up on a tropical island, only to pan out to discover you're watching a video of your exploits from the confines of a bamboo tiger cage, held captive by an extremely well-acted psychopath named Vaas. After a harrowing escape from the prison camp and some hand-holding by one of the locals, you're set free to pursue the main quest, or just explore on your own. And explore you will, as you must climb radio towers to remove scrambling devices that obscure the island's map, which also allows the local gun shops to receive new shipments. Pirates control local outposts, too, so you have to clear those in order to buy new weapons, replenish your ammo, configure your weapon loadouts, and fast-travel from base to base. Clearing outposts is easily the most thrilling part of the game, and you can clear them at your leisure, too, or not—the game doesn't punish you either way, but creeping up on a base undetected, tagging all the enemies with your camera, then moving in stealthily to take them out one by one before any of them hits the alarm—or disabling the alarms first—is the highlight of this game. And each of the 34 outposts are a serious challenge and a thesis on open-world gameplay done right.

In addition to clearing outposts, climbing radio towers, and the main quest, you also must hunt wildlife in order to upgrade your ammo packs, wallet, holsters, arrow quiver, and syringe holder. Each lets you hold more ammo, health syringes, grenades, Molotovs, and more. This isn't Deer Hunter, either, as hunting is a challenge—you have to bag leopards, Cassowarys, rabid dogs, tigers, bears, and lots more. Additionally, clearing outposts opens up Wanted Dead and Path of the Hunter quests that require you to kill certain animals with specific weapons and take down a nearby kingpin using only your knife, but sadly, once all the outposts are clear, not only is the world devoid of bad guys but there are no more of these quests, either.

The main problem with the game is that you spend the first half of it going on epic adventures to upgrade your packs, open the map, and increase your skills, but by the time the game is half over, we found ourselves almost maxed out completely in every area possible. We had a huge wallet that was constantly full, all the weapons that were available, and almost every skill on the three separate trees, giving us little motivation to keep exploring. You can also find 120 scattered relics and 20 randomly located letters from WWII-era Japanese soldiers, and compete in contests such as knife-throwing, shooting, and driving, but they provide little benefit aside from a test of skill and extra money, which is usually unnecessary. The game also provides a dozen side missions that are so boring a lot of them left us wondering why the developers even bothered including them.

We absolutely loved this game for the first 15 hours or so, and were even considering it as the Game of the Year. But after plodding through the second half of the game, repeating a lot of the same tasks over and over, and suffering through the game's hackneyed story and deplorable ending, our opinion changed. We still highly recommend it; just savor your time on the first island—it's one of the best FPS experiences we've ever had. –JOSH NOREM

VERDICT 9

Far Cry 3

+ VAAS Pulse-pounding gameplay; superb weapon selection; satisfying gunplay; gorgeous graphics.

– HOYT Peaks too early; main story is weak; too many cutscenes.

$60, ubi.com, ESRB: M



You'll need to use your environment well to effectively hide from your enemies.

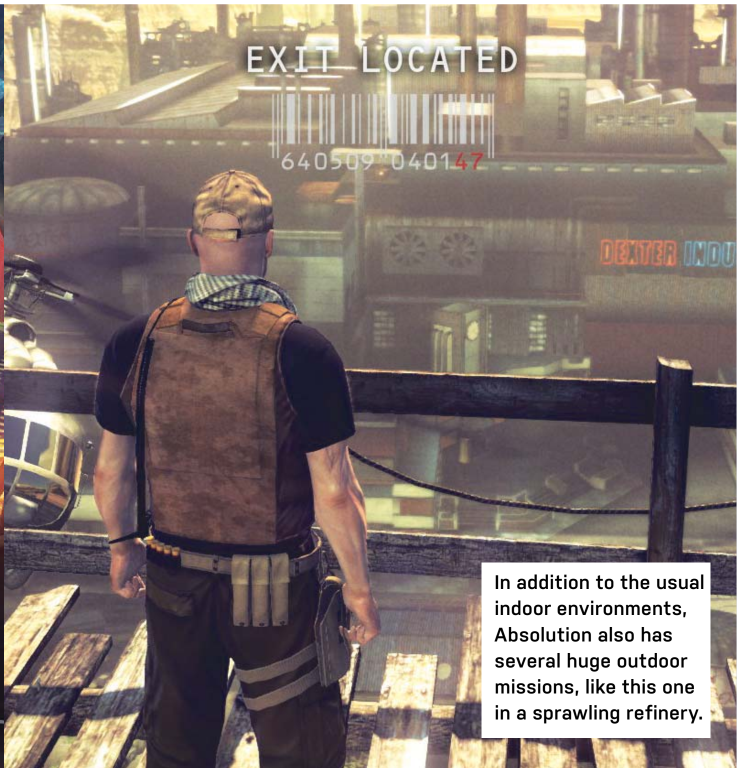
Hitman: Absolution

Equal parts frustration and fun

IT'S BEEN A WHILE since we've heard anything from IO Interactive's popular stealth hero, Agent 47 (no pun intended). The star of the popular Hitman franchise is back for a fifth installment, and it's about time, as the last game—Blood Money—was released way back in 2006. This time around, the agency employing Agent 47 is tired of paying for his benefits package, so they decide to assassinate *him*. This sets Agent 47 on a mission to dispose of his would-be disposers, taking him, and you, through 20 wide-ranging missions in an effort to stay alive while simultaneously sending the folks who are conspiring against him to the morgue. The premise is great, but we found the game's execution—again, no pun intended—to be a mixture of awesome and awful.

Like the previous titles, the game consists of missions that require you to assassinate predetermined targets. To help you accomplish your objectives, you're given a range of weaponry, intel, and abilities, and it's up to you to put all three to good use. The most useful is a powerful stealth skill called Instinct, which helps you blend into your surroundings, see through walls, and sneak past guards. At the beginning of each mission, you're given a small amount of this ability—your supply can be monitored on the HUD—which depletes as you use it, but is replenished by incapacitating foes and reaching checkpoints. Instinct's X-ray vision comes in handy when planning assassinations, allowing you to gaze through a wall at a potential target from relative safety. It's a really fun skill to use, especially when it lets you slow down time and kill multiple enemies quickly. We were disappointed, however, with how quickly it was depleted—the quick drain forced us to stray from our mission priorities and kill people randomly just to replenish our stores.

In addition to Instinct, there's an array of weaponry lying around the levels that you can use to your advantage, ranging from a simple kitchen knife to a 50-caliber sniper rifle (both the kitchen knife and sniper rifle provide one-hit kills, whether up close or from a distance. Good times.). Our favorite killing tool was Agent 47's signature weapon, the Fiber Wire, which we used to garrotte scumbags and then quickly drag them out of sight in order to remain undetected. We also enjoyed his *other* signature weapon, the Silenced Silver Baller. Its rapid fire-rate combined with the Instinct ability let us take down multiple targets quickly and with plenty of panache. While we preferred the game's stealth weapons, they aren't the only options by a long shot. Attention-getting weapons such as a shotgun or 45-caliber handgun are also available. Be warned, however, that using any of these loud hand cannons will almost always result in the arrival of a ridiculous amount of enemy



In addition to the usual indoor environments, Absolution also has several huge outdoor missions, like this one in a sprawling refinery.


In Absolution, you often have to use large crowds to conceal yourself.

backup—which we consider a flaw in the game's design. In addition to the weapons provided, you can also use random objects lying around the environment, including a rusty screwdriver, a kitchen knife, and a doctor's scalpel, to name just a few. We favored the knives because they are silent and reusable from one kill to the next.

Easily our biggest complaint about Absolution is that it's not just difficult, it seems unfairly difficult. We were frustrated by the sense that we were playing missions over and over—in what is billed as an "open environment"—just to get through the missions the way the developers apparently felt we should. There's a tutorial, but it's of little use once the game drops you into a "real" mission, where you have no idea where enemies or objectives are located. We found that it took almost six hours to really get the hang of the gameplay and the assassination moves necessary to be successful, and getting to that point was a mostly trial-and-error exercise that was simply monotonous. We had to play one of the game's early missions around 20 times to make it to one of the checkpoints, and almost rage-quit the game many times because it was so aggravating.

The game's main campaign took us nearly 14 hours to complete, and once we had, there was little reason to return to it, unlike in Dishonored, where there are many ways to progress through the levels, as well as totally different endings according to our playing style. Hitman tries to add replayability by giving you a ranking at the end of each level based on how many people you killed and how many people spotted you, and it automatically uploads your score to a global leader board. This peer-pressure tactic could compel some people to redo levels to get a better score, but we had so much trouble finishing the levels the first time that we had zero desire to try them again. The game also climaxes early, which made the last half of the game drag on way too long.

Aside from the main campaign, there is also a Contracts mode that lets you play missions that you or other players create using the built-in mission editor. This mode is always available, and lets you participate in ranked assassination attempts, but in order to unlock all the necessary weaponry and gadgets, you'll need to progress through the main campaign first. All in all, it's an excellent addition to the game, as there are thousands of user-created missions available through the game's online lobby, which lists them with descriptions and popularity rankings.

The graphics in Hitman are impressive, with sharp textures and a variety of well-made environments, ranging from a dirty inner city to the dusty deserts of the Deep South. The game also played very well on our overclocked Intel Sandy Bridge system with an Nvidia GTX 660 Ti video card, averaging 88fps with all settings maxed-out at 1080p.

In the end, Hitman: Absolution is a challenging stealth action game with impressive visuals, but it's marred by a steep learning curve, too much trial and error, and a campaign that drags on too long. We liked the open-ended nature of the missions and the variety of options and weapons available to us, but ultimately found ourselves so frustrated we just wanted to finish the game and never play it again. We appreciate the added Contracts missions, but found the overall experience of this game to be underwhelming.
–CHRIS ZELE

VERDICT 7

Hitman: Absolution

+ GOOGLE SEARCH Fantastic visuals; great stealth assassinations; user-created missions.

– BING SEARCH Early climax; frustratingly steep learning curve.

$60, www.hitman.com

LAB NOTES

JOSH NOREM **SENIOR EDITOR**



Storage Gets Almost Too Extreme

Who needs a key that can withstand 10 tons of weight?

THIS MONTH, I was handed two extra-rugged USB keys from LaCie and Corsair, so like Dolph Lundgren in *Rocky IV* I looked at them and muttered, "I will break you." Before I could begin testing, though, I went online to look at each key's specs to make sure I wasn't being too rough on either one of them, and when I saw their rated tolerances I realized it would actually be a challenge to even put a dent in these devices. Undeterred, my testing began with freezing the keys overnight, then thawing them out, and then baking them in an oven at 350 F for an hour. Next, I drove over them with a hatchback, then a full-size pickup truck, and then I sent them through a wash and dry cycle that almost destroyed my apartment building's dryer. My landlord was *pissed* when she found out, but it's a small price to pay for science.





Jimmy Thang
Online Managing Editor

On my flight back from CES, my plane was full of techies. Before takeoff, the flight attendant told the guy sitting next to me to put away his iPhone. He wouldn't listen and insisted it was perfectly safe to have it out before loudly arguing that it was a stupid, unnecessary rule. Hey, I love technology as much as the next guy, but can we avoid being children about our addiction?



Katherine Stevenson
Editor-in-Chief

Once we've put this issue to bed, I'm going to get cracking on a couple of my new year's tech resolutions: building a bigger system (buh-bye, Micro-ATX) with an SSD boot drive (hello, life-altering startups) and Windows 8 (what the heck?); and setting up a Zotac Zbox Nano PC in the living room for HTPC duties.



Gordon Mah Ung
Deputy Editor

I'm still bitterly torn over Windows 8 for desktop use. There are times when the new operating system is simply annoying as hell. But when used with a laptop or all-in-one with a responsive touchscreen, it's actually pretty damned cool. Hell, if the apps were better in Modern, I'd spend even more time in that environment rather than bailing out to the desktop so often.



Richard Koscher
Art Director

This is the year to break free of old habits. Since 2007, I have owned an iPhone, and I'm not sure if it was the crazy media hype, brats getting upset that they got the wrong color iPhone for Christmas, the fanboys in those ridiculous lines for yet another version that we didn't need, or the expensive AT&T rates that drove me to an Android and Virgin's $35-a-month plan. Whatever the reason, I'm saving a lot of dough.

LETTERS

WE TACKLE TOUGH READER QUESTIONS ON...

> System Mechanic
> Discrete Sound Cards
> The Socket Pledge

System Mechanic Skeptic

Your February 2013 issue included a letter from a reader indicating how much he thought of System Mechanic by Iolo. In researching the program on the Internet, I found a lot of bad reviews of it. I would like to know if *Maximum PC* researched and tested this program before publishing the reader's complimentary comments, and does *Maximum PC* concur with the letter you published and recommend the program yourself? Maybe the current version has fixed the problems that are alleged to have existed in some earlier versions.

—George Clendenin

EDITOR-IN-CHIEF KATHERINE STEVENSON RESPONDS: In our November 2012 roundup of PC optimizers—which prompted the letter you're referring to—contributing writer and software tester Henry Winchester found System Mechanic to be an "admirable" product, awarding it a 9 verdict. His assessment speaks for itself and for *Maximum PC*.

CUT, COPY, PASTE

In the February 2013 Blueprint section, the Cooler Master Cosmos II was listed for $110; the price is actually more like $350.

We Don't Need No Stinking Sound Cards

I had a bit of a "huh" moment upon reading your review of the Creative Z series sound card (February 2013), wondering why anyone would recommend wasting good money on a dedicated sound card, when HDMI audio has the same digital advantage over the integrated audio in many motherboards and already comes included on the graphics cards many *Maximum PC* readers have.

As much as the editors of *Maximum PC* would like to imagine that all readers have high-end sound systems connected to their PCs, most are probably running either headphones or some cheap 2.1 speaker setup they picked up at big box store. In these cases, the users would be better served by using the HDMI audio on their video cards to connect to any HDMI TV/monitor, or HDMI-based surround setup they have, either using the TV/monitor/receiver's headphone jack, or using the integrated audio if headphones are needed.

—Ron Rogers Jr.

DEPUTY EDITOR GORDON MAH UNG RESPONDS: If only it were that simple. PC audio is as complicated as a 150-year-old building's plumbing system that's been patched up over and over again. I disagree that buying a discrete sound card is a waste of money. Onboard audio, frankly, can run the gamut from OK to pretty horrible. If you really do value good audio, a discrete audio card—even a low-cost unit—can be a worthwhile upgrade. As far as using HDMI out, it isn't quite that simple. Few multimedia speakers support HDMI input. Few people use a home audio receiver for their desktop machine. For headphones, USB audio is probably the most preferred method, as it's clean, simple, and cost-effective. The only problem with both these approaches is they eliminate your ability to do any advanced audio filtering. Companies such as Creative own a massive portfolio of positional audio algorithms that are almost impossible to beat. The real issue these days is a lack of a good audio API and developer support for it. I can say that I'm 99 percent certain that if you ever played Battlefield 2 with an EAX5-enabled sound card and good analog headphones, you would never want to go back to integrated audio or HDMI audio.

AMD Machine Was Hobbled by Win7

Josh Norem built a really nice AMD machine (January 2013) with the new Vishera CPU, and thank you for that, but he apparently used Windows 7. If he had installed Windows 8 with its updated scheduler, the benchmarks may have been better. It would be nice to compare the Win7 results against Win8 on the same rig. I know even the Vishera can't compete with the top-of-the-line Intel products, but at AMD's prices, they are a good value.

—Whit Bauer

SENIOR EDITOR JOSH NOREM RESPONDS: We're glad you liked the machine, Whit—it was a great little box, even

↘ submit your questions to: comments@maximumpc.com

though it was treated to a bullying by our overpowered zero-point machine. With regards to your question, we've done those benchmarks before and found there is a very, very small difference in performance on Vishera machines when running Windows 8 and Windows 7, as in 1 or 2 percentage points, if that. AMD itself is claiming "up to 10 percent performance" boost in Windows 8 with Vishera, but in its release it only lists one game—Left 4 Dead 2—which goes from 140fps to 154fps, as proof of its claim. The rest of the tests AMD lists show 2–4 percent gains when moving from Windows 7 to Windows 8, but again, in our tests it's usually around 1–2 percent.

I Won't Take the Socket Pledge

Regarding Gordon Mah Ung's editorial in the February issue, if you were told 10 or 15 years ago that a substantial base of PC users would be tweaking the core voltage of their CPUs, what would you have thought? Even more interesting, that hardcore users would be pouring liquid nitrogen into systems creating an arctic winter wonderland for overclocking? In 25 years of PC building, it is always amazing to sit back and look at how far technology has come and how many things remain the same. We now know that 640K of RAM is not enough for anyone, that port 25 drives the entire business world, and as much as we love new technology, we resist change. It seems the whole world is up in arms over socketed vs. soldered processors, yet there's no discussion as to why it would be implemented in the first place.

In five years, you will see hybrid Electra-optical processors providing parallel threading capabilities that are unfathomable at the moment. In 10 years, entire optical processors and subsystems will be moving data to a monitor at speeds that will finally announce the end of Moore's law. In 20 years, you will be uploading your CT scan to a doctor via sunglasses and 12-year-old hackers will be soldering chips to motherboards they printed from a phone.

Acquiring new skills is what made me the geek I am today, and while BGA may only represent a 10 percent increase in performance with fewer failures during overclock, it's irresistible to my inner hacker. I have owned every generation of Intel processor and most of AMD's with pride, however, the DX4-100 in the attic won't come out of retirement anytime soon. So, sign the pledge if you want, just remember someone else will grab those skills and you will become obsolete.

—Grant Gibson

Wrong Answer!

As a dedicated subscriber and reader, I feel it is important to inform you that Cherry MX Gray is a keyboard switch. It is used on the spacebars on MX Clear keyboards. Thus it is not the correct answer for Question 35 of the Geek Quiz (January 2013).

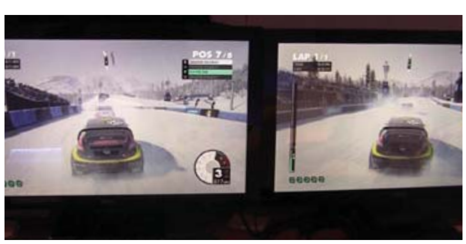
—Ben Klebe

EDITOR-IN-CHIEF KATHERINE STEVENSON RESPONDS: Thanks for the schooling, Ben. I guess we aren't eligible for Full Wizard Neckbeard Alien status.

[NOW ONLINE]

HASWELL GRAPHICS TAKE ON GEFORCE GT 650M

With Intel pushing to improve integrated graphics with every generation, Haswell is easily the company's best effort yet. Visit http://bit.ly/VG9a3C to see how well it stacks up against Nvidia's GeForce GT 650M GPU running Dirt 3. We'll be surprised if you can even tell the diff.



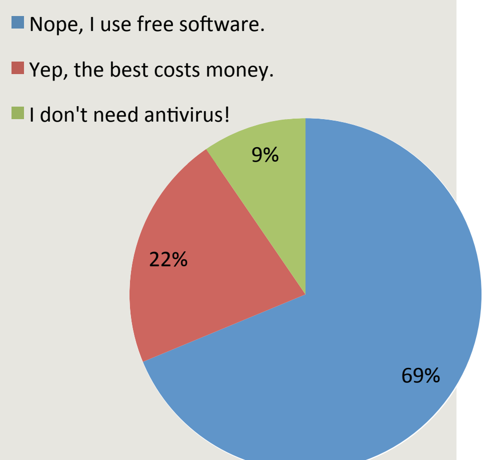
Facebook Polls

How Our Readers Break-in a New PC

In honor of this month's guide on proper procedures for a new PC (page 22), we asked our Facebook fans what they do first with a newly purchased PC. As always, the answers are illuminating.

Matt Cooper: Update the firmwares and drivers!
Keith Verwey: Hug it and give it a cute name
Tyson Schamehorn: Remove Internet Explorer
Haemish Edgerton: Update the BIOS, then work up to firmware, drivers, etc.
John Croft: Get rid of all the crapware
Ryan Polly Caliwag: Install AV, reinstall Windows, update Windows, then overclock
Jay Stevens: Take pictures of identifying marks and serial numbers in case it's stolen
Mark Mahoney: Run diagnostics and benchmarks
Jason Sandlin: Install Linux
Stephen Petrie: Slowly and seductively pull off the protective film
Jake Rasp: Sleeve the cables
John Spann: Run my hand over the cold, metal case, and smile
Kyle Shafar: Set it to dual-boot Ubuntu Linux
Robert Chester: Smell the new PC smell; it's like a new car
Ben Krueger: I don't buy new PCs, I build my own!

Do You Pay For Antivirus Software?



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THE BUILDS



BASELINE

INGREDIENTS

PART		URL
Case	Corsair Carbide 200R	www.corsair.com
PSU	Corsair HX650	www.corsair.com
Mobo	Asus P8Z77-V	www.asus.com
CPU	Intel Core i5-3570K	www.intel.com
Cooler	Cooler Master Hyper 212 Evo	www.coolermaster.com
GPU	EVGA GTX 660 Ti	www.evga.com
RAM	8GB Patriot Gamer DDR3/1600	www.patriotmemory.com
Optical Drive	Lite-On iHAS124-04	www.liteon.com NEW
SSD	128GB Samsung 840 Series	www.samsung.com NEW
Hard Drive	1TB Seagate Barracuda	www.seagate.com
Operating System	Windows 7 Home Premium 64-bit	www.microsoft.com

Approximate Price: $1,083

STOP THE PRESSES, everyone, because we have a huge announcement to make regarding our Baseline system this month. In what can only be described as the biggest change to be made since we switched this computer from a Mac to a PC, this month we've changed the optical drive. The truth is, we liked the Samsung drive we used previously, but the Lite-On iHAS reminds us of Cheezburger cat, plus it's about $10 less expensive. We also swapped the Samsung 830 SSD for the new 840 Series because it costs about $30 less. Astute readers will note that the 830 is actually faster than the 840, but this is a baseline machine, so we're just looking for "good" performance at the best price, and for now, that's the Samsung 840.



PERFORMANCE

INGREDIENTS

PART		URL
Case	Thermaltake New Soprano	www.thermaltake.com NEW
PSU	Corsair HX750	www.corsair.com
Mobo	Asus Sabertooth X79	www.asus.com
CPU	Intel Core i7-3820	www.intel.com
Cooler	Corsair H80i	wwww.corsair.com NEW
GPU	MSI GeForce GTX 670	www.msi.com
RAM	16GB Corsair Vengeance	www.corsair.com
Optical Drive	Asus BW-12B1ST	www.asus.com NEW
SSD	256GB OCZ Vector	www.ocz.com NEW
Hard Drive	3TB Seagate Barracuda	www.seagate.com
Operating System	Windows 7 Professional 64-bit	www.microsoft.com

Approximate Price: $2,008

OUR PERFORMANCE build went under the knife this month, emerging with a slightly inflated price tag but running stronger, cooler, and sexier than ever. The first part we jettisoned was the NZXT Phantom 410 chassis, which has been our Performance case of choice since we started this section in June 2012. In its place goes the Kick Ass award–winning Thermaltake New Soprano, which has a more upscale fit and finish, more interior space, and better cable-routing grommets. The NZXT Havik 140 CPU cooler was also S-canned in favor of the updated Corsair H80i closed-loop water cooler we reviewed this month (page 83) because we think it's, uh, cooler. Finally, we swapped the Corsair Neutron GTX for an OCZ Vector just because it's faster in our tests, and it costs only $10 more. We also swapped the optical drive, but the reasons are too complicated to fully detail here. If you want the full story, email us at tellmeabouttheopticaldrive@maximumpc.com.



ULTRA

WE KNOW YOU'RE anxious to hear about the choice we've made for the Ultra rig's optical drive, and you should be, because it's a doozy. Before we get to that, though, let's talk about all the other changes we made to this mighty machine. OK, first we took this machine and basically left it untouched. You know as well as we do that there's not much competition these days in the universe in which this PC exists, so until Nvidia, Intel, and AMD come out with some more parts, we'll be running this config for the foreseeable future. One interesting note, though: Last month we tested the PowerColor Devil 13, which is the GTX 690's arch nemesis, sporting dual HD 7970 GPUs. As you can see, we're still running the GTX 690. Put simply, the Devil 13 was not quite as fast while producing much more heat and noise, and it was also so heavy it required something we didn't even know existed—a support stand called a PowerJack to keep it snug in its PCI Express slot. So, in a nutshell, the Ultra rig is mostly unchanged, except for one part—yep, the optical drive. We switched from a Lite-On BD-R drive to one from Asus after running more than two dozen benchmarks, overlaying graphs of failure rates for both drives over the past nine months, and consulting with our shaman. It's also $20 less expensive.

INGREDIENTS

PART		URL
CASE	Cooler Master Cosmos II	www.coolermaster.com
PSU	Thermaltake Toughpower Grand 1050W	www.thermaltake.com
Mobo	Asus P9X79 Deluxe	www.asus.com
CPU	Intel Core i7-3930K	www.intel.com
Cooler	Corsair H100	www.corsair.com
GPU	Asus GTX 690	www.asus.com
RAM	16GB Corsair Vengeance	www.corsair.com
Optical Drive	Asus BC-12B1ST BD-R Burner	**NEW** www.asus.com
Solid-State Drive	Corsair Neutron GTX 480GB	www.corsair.com
Hard Drive	Seagate Barracuda 3TB	www.seagate.com
Operating System	Windows 7 Professional 64-bit	www.microsoft.com

Approximate Price: $3,440

For our complete Best of the Best list of recommended components, visit www.maximumpc.com/best-of-the-best.

KICK ASS PARTS

Gear we've deemed worthy of high honors



WATER-COOLING SYSTEM
Corsair H80i
$110, www.corsair.com



SSD
OCZ Vector
$250, www.ocz.com



LGA1155 MOTHERBOARD
Asus P8Z77-V
$190, www.asus.com



FULL-TOWER CASE
Azza Genesis 9000
$170, www.azzatek.com



CPU COOLER
Cooler Master Hyper 212 Evo
$30, www.coolermaster.com

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